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**THE DUCKS, GEESE AND SWANS
OF NORTH AMERICA**

THE DUCKS, GEESE AND SWANS OF NORTH AMERICA

A vade mecum

FOR THE NATURALIST AND THE SPORTSMAN

By

FRANCIS H. KORTRIGHT

Toronto, Canada

ILLUSTRATIONS BY

T. M. SHORTT

Toronto, Canada

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INTRODUCTION

The existing literature on the identification of waterfowl describes mainly their spring plumages. This is of little avail to the sportsman who is afield mainly in the fall, and it hardly suffices for the ornithologist, who is afield at all seasons.

Early fall plumages in many ducks are confusingly similar, vary with sex and age, and change with the fall moult. Hence it is often impossible to identify a bird-in-hand, even after looking it up in a "bird book." The existing books do not suffice.

Mr. Kortright has sensed the need for a year-round waterfowl book and has done a scholarly job of writing one. While he disclaims being an ornithologist, I detect no lack of ornithological competence in what he has written. I do find much useful and interesting subject matter which most ornithologists omit: What does a given species weigh, and how does weight vary? How does one distinguish a bird of the year from an old bird? When do the moults occur?

The best printed description often fails to clarify the distinctive character of a species without the help of a competent artist. Mr. Shortt's paintings, portraying *all* of the more important plumages of a given species, in themselves justify the publication of this volume. His drawings of diagnostic features will also clarify many a moot point.

I particularly endorse Mr. Kortright's thesis that the sportsman of the future must get his satisfactions by enlarging himself rather than by enlarging his bag. The homebound sportsman unable to name the ducks slung over his shoulder is an anachronism, a relic of that I-got-my-limit era which nearly ruined the continent and its resources. Few sportsmen have ever tried the sport of learning something about the game they pursue, the wildlife they see, or the plants they tramp over. Why is this species here? Whence does it come, where go? What limits its abundance? What was its role in history? What are its prospects for survival? What peculiarities of habit and habitat comprise its "standard of living"? To always seek but never quite achieve a "bag-limit" of answers to such questions is the sport of the future.

To my mind it is appropriate that this book should issue from the pen of a Canadian. Canada is the birthplace of most waterfowl; this book attests her growing activity in waterfowl research and conservation.

ALDO LEOPOLD,
Professor of Wildlife Management
University of Wisconsin

FOREWORD

I wish, at the outset, to state frankly that I am not an ornithologist. From boyhood, however, I have taken a keen interest in wildfowl, and I have indulged to a limited extent in the grand sport of duck shooting. As a gunner I have always felt, along with others of the fraternity, the need of a handbook dealing exclusively with the Ducks, Geese, and Swans—a portable book—one which would readily provide the answers and settle the arguments that take place around the camp stove after a day's shoot.

I believe that most gunners want to know more about the birds that furnish their favorite pastime, but to obtain this knowledge from existing literature it is necessary to possess an extensive library. This is not possible in the case of most of us, and, any event, it would not be at hand when most needed.

With much trepidation, therefore, and with a full realization of my lack of qualification for the task, I undertook to compile the kind of manual which I, myself, had long desired, and which I felt was the type of book that the majority of gunners and many naturalists would find useful.

All of the Ducks, Geese and Swans native to North America, as well as such extralimital species as are frequent visitors to this continent, are included in this work.

Nothing original is contributed by this book, as everything it contains has been gleaned from the researches and writings of others. I do believe, however, that the manner of presentation of the data is novel, that the type of information included is that which is desired, and that, within its scope, the book is complete. The same pattern has been strictly followed throughout the text, so that the reader, once he has become familiar with the plan of the book, should never be at a loss to find desired information.

All the "Descriptions" have been carefully verified from the large collection of skins at the Royal Ontario Museum of Zoology, at Toronto, amplified where necessary from the collection of the National Museum of Canada, at Ottawa. The descriptions of the soft parts (bills, feet and eyes) were written after consultation with such standard works of reference as Coues, Forbush, Roberts, Witherby, and Grinnell, Bryant and Storer, and compared with the Dwight Collection of Soft Part Studies by Major Allan Brooks, at the Royal Ontario Museum of Zoology, and checked with the studies of soft parts made by T. M. Shortt.

The weights and other measurements were furnished through the kind cooperation of many of the leading museums of the United States and Canada, and of many individual ornithologists. The number of measurements given in this book are considerably greater than any that have heretofore been published, and I believe that in most cases the fig-

ures are sufficient to ensure that the averages may be assumed to be substantially accurate. (Alas, ye 5-pound Mallards and Blacks!)

The range maps show the principal winter and breeding ranges, but disregard isolated breeding colonies and isolated winter records or records of occasional occurrence, as without considerable explanation it would not be possible to confer on such records their proper importance. Again, owing to the necessarily small scale of these maps, and for the sake of clarity, the ranges of certain of the birds, particularly along coastal regions, have been appreciably deepened. To this extent the maps are diagrammatic only, but, I believe, are not thereby seriously impaired for the purpose for which they are intended.

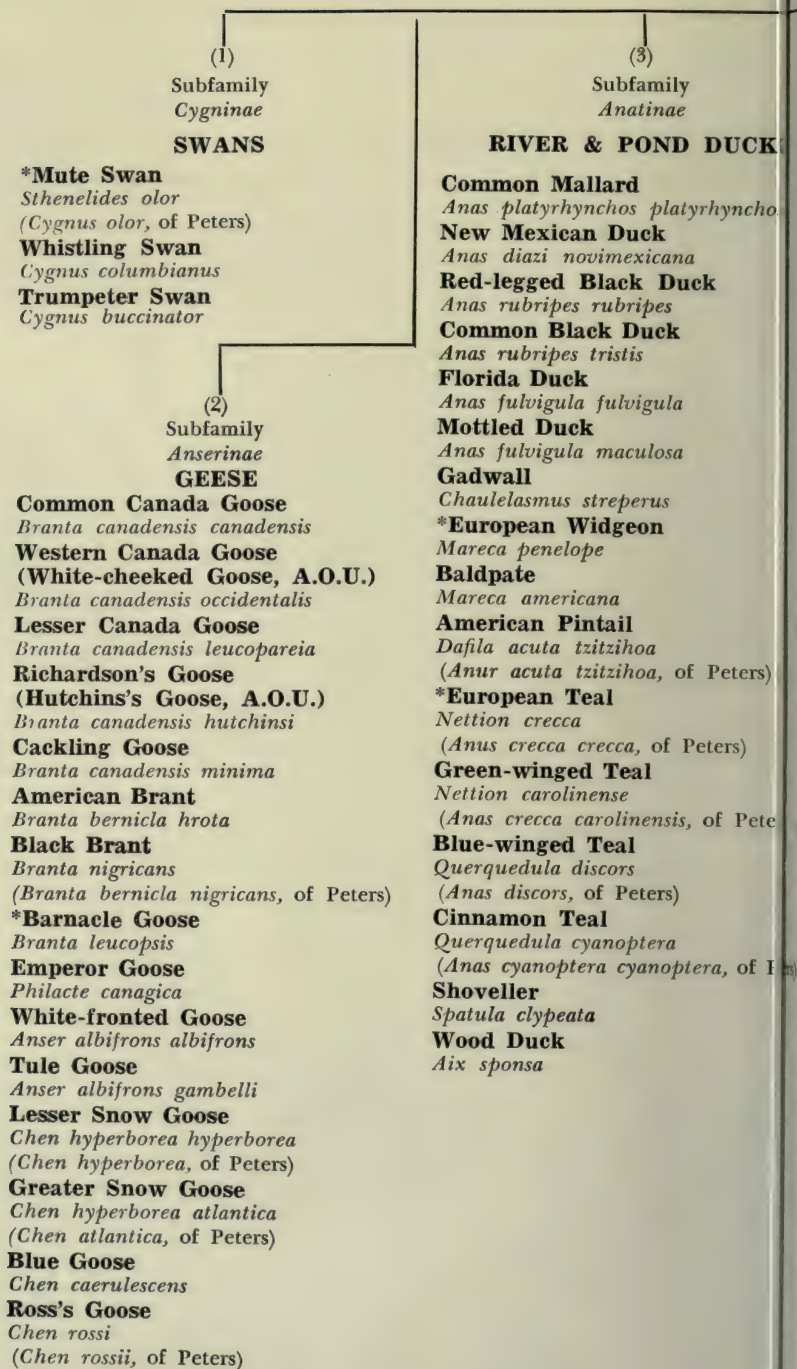
The scientific names employed herein are those given in the American Ornithologists' Union Check List, 1931 Edition, and, where these differ from the names adopted by Peters in his Check List of Birds of the World, 1931, the nomenclature of both authorities is quoted.

Credit is given in the "Acknowledgments" to the many who have so kindly and so generously supplied me with necessary information, but special tribute must be paid to Dr. Harrison F. Lewis, Chief Federal Migratory Bird Officer for Ontario and Quebec; to our gifted artist, Mr. T. M. Shortt, of the Royal Ontario Museum of Zoology; and to Mr. R. D. Ussher, of Toronto. Without the advice, encouragement, and help of these gentlemen this work would never have been accomplished.

Of the many publications consulted and cited, the one which has been of outstanding use is "Life Histories of North American Wild Fowl," by Arthur Cleveland Bent. The reader will unquestionably enjoy the quotations which have been made from the pen of this gifted writer, and from his words sportsmen will recognize him as a master craftsman.

This book is dedicated to the Sportsmen Gunners and the Naturalists of Canada and the United States. The writer hopes that it will prove interesting, and if, through the increased knowledge it imparts, it assists even in a small measure in the great work of conservation of our wildfowl it will accomplish a useful purpose.

F. H. KORTRIGHT,
Toronto, Canada.



y Anatidae
SE AND SWANS

and on Peter's Check List of Birds of the World, 1931)

(4)

Subfamily
Nyrocinæ

BAY, SEA OR DIVING DUCKS

Redhead

Nyroca americana

Ring-necked Duck

Nyroca collaris

Canvas-back

Nyroca valisineria

Greater Scaup Duck

Nyroca marila

(*Nyroca marila nearctica*, of Peters)

Lesser Scaup Duck

Nyroca affinis

American Golden-eye

Glaucionetta clangula americana

(*Bucephala clangula americana*, of
Peters)

Barrow's Golden-eye

Glaucionetta islandica

(*Bucephala islandica*, of Peters)

Buffle-head

Charitonetta albeola

(*Bucephala albeola*, of Peters)

Old-squaw

Clangula hyemalis

Eastern Harlequin Duck

Histrionicus histrionicus histrionicus

Western Harlequin Duck

Histrionicus histrionicus pacificus

Labrador Duck

[Extinct]

Camptorhynchus labradorius

Steller's Eider

Polysticta stelleri

Northern Eider

Somateria mollissima borealis

American Eider

Somateria mollissima dresseri

Pacific Eider

Somateria v-nigra

(*Somateria mollissima v-nigra*,
of Peters)

King Eider

Somateria spectabilis

Spectacled Eider

Arctonetta fischeri

White-winged Scoter

Melanitta deglandi

(*Melanitta fusca deglandi*, of Peters)

Surf Scoter

Melanitta perspicillata

American Scoter

Oidemia americana

(5)

Subfamily
Merginæ

MERGANSERS

Hooded Merganser

Lophodytes cucullatus

American Merganser

Mergus merganser americanus

Red-breasted Merganser

Mergus serrator

(6)

Subfamily
Erismaturinæ

(*Oxyurinae*, of Peters)

RUDDY & MASKED DUCKS

Ruddy Duck

Erismatura jamaicensis rubida

(*Oxyura jamaicensis rubida*, of
Peters)

***Masked Duck**

Nomonyx dominicus

(7)

Subfamily
Dendrocygninæ

TREE DUCKS

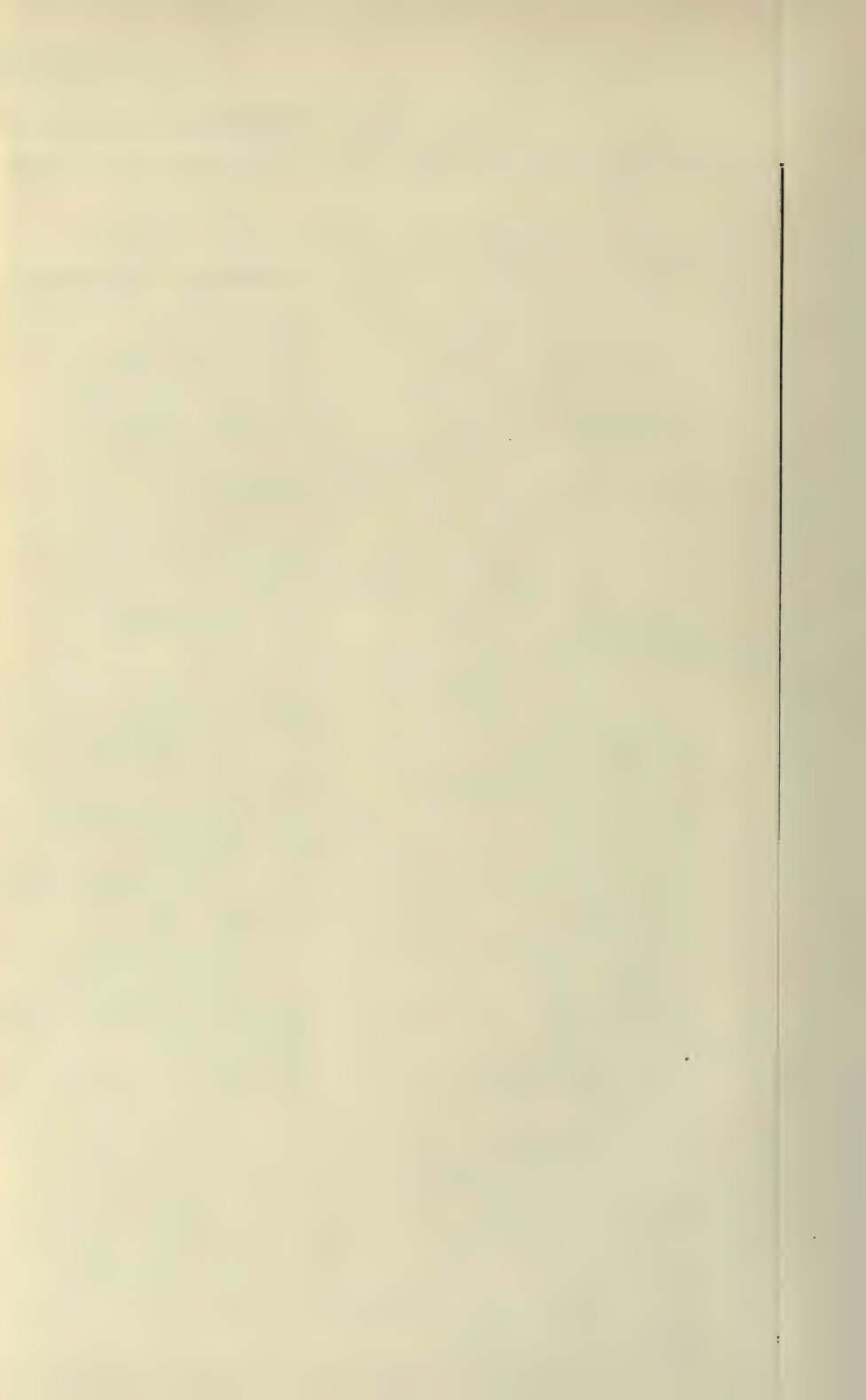
Black-bellied Tree Duck

Dendrocygna autumnalis autumnalis

Fulvous Tree Duck

Dendrocygna bicolor helva

* Not native to the continent of
North America.



SWANS, GEESE AND DUCKS

Family *Anatidae*

The Swans, Geese, and Ducks belong to the Family *Anatidae*. This Family includes all web-footed swimming birds with lamellate bills.

The Family comprises about 225 forms, distributed throughout the world; 61 of these are found in North America, including 4 species (see list below) that are more or less regular visitors to this continent. In addition, 15 other species have been recorded as accidental or casual visitors but their occurrence here has been so rare that they are not included in this work (see list below).

The Family *Anatidae* is characterized by the following general features:

(a) The bill is broad and flat (except in the Geese and Mergansers), and lamellate, that is, fitted with lamellae, or tooth-like serrations along the edges of both mandibles; the serrations on the upper and lower mandibles fit together and form a strainer which permits retention of food particles and expulsion of water taken into the mouth; the serrations vary in number and form in the different species; the bill has a soft, leather-like, membranous covering, and is equipped with a "nail" or hard spot at the tip of the upper mandible, usually bent over in the form of a hook; the tongue is fleshy and, in some, provided with serrations or papillae along the edges.

(b) The foot has four toes; the three in front joined together by two fully developed webs; the hind toe is small, somewhat elevated, and free.

(c) The legs are short (except in the Tree Ducks, and placed far apart, not so near the centre of the body as in the gulls, and not as far back as in the Grebes (except in the Ruddy Duck group, in which they are well to the rear); the legs are feathered nearly to the "ankle" joint; the position and length of the legs give the birds a peculiar waddling gait.

(d) The body is more or less flattened; the tail usually short (except in the Ruddy Duck group); the wings moderately long; the neck usually long; the surface plumage firm and dense, especially on the breast, which has a copious underlay of down.

(e) The majority nest on the ground, but some nest in hollow trees and stumps; the eggs usually are numerous, oval in shape, and plain in colour; the young are covered with down when first hatched and almost immediately can walk and swim.

(f) During the summer moult the flight-feathers are shed simultaneously and the birds become flightless for a while. (The flight-feathers of most other birds, with the exception of such birds as Loons and Grebes, are replaced gradually and the power of flight is not lost during any moult.)

(g) The birds of this Family are provided with an oil gland, the ducts of which open terminally in a nipple-like elevation on the "pope's nose" at the root of the tail; the gland secretes a greasy fluid which the

bird presses out with its bill, and uses to dress the feathers during the operation known as "preening." (This gland is not peculiar to the birds of this Family.)

The species that are included in this work as more or less regular visitors are: the Barnacle Goose, European Widgeon, European Teal, and Masked Duck.

The casual or accidental visitors to this continent, not included in this work, are:

(1) Whooper Swan, casual in Greenland; (2) Bean Goose, accidental in Greenland; (3) Pink-footed Goose, accidental in Massachusetts; (4) White-faced Tree Duck, accidental in New Jersey; (5) Sheld-Duck, accidental in Massachusetts; (6) Ruddy Sheldrake, accidental in New Jersey and North Carolina; (7) Greenland Mallard, resident in Greenland; (8) Bahama Pintail, casual in Florida and Wisconsin; (9) Falcated Teal, casual in Pribilof Islands; (10) Baikal Teal, casual in Alaska; (11) Pochard, casual in Pribilof Islands; (12) Tufted Duck, casual in Pribilof Islands and Greenland; (13) Rufous-crested Duck, casual in Long Island; (14) European Golden-eye, casual in Pribilof Islands; (15) Velvet Scoter, accidental in Greenland.

SWANS

Subfamily *Cygninae*

There are, distributed throughout the world, nine forms of Swans, of which three, including the Mute Swan, introduced from Europe, are found regularly in North America.

The following features characterize this Subfamily:

(a) Very large size; the sexes, as in the Geese, are alike in colour; the plumage of adults is usually snowy white; the necks are extremely long, even longer than the body, having 22 to 25 vertebrae

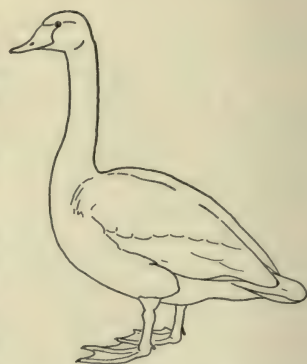


FIG. 1.—Typical swan

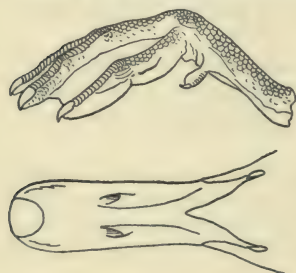


FIG. 2.—Foot and bill of swan showing reticulate tarsus

(Geese have less than 20); the appearance is stately, with graceful curving of the neck; the habit is almost exclusively aquatic.

(b) Space between the eye and the bill, the lores, bare (covered with down in the young); bill, high at base, broad and flattened at the tip.

(c) Tarsi, like those of the Geese, are reticulate all around, that is, covered uniformly with small hexagonal scales (scutellate in Ducks); hind toe with small flap or lobe; legs placed farther back than in the Geese.

(d) Windpipe of North American species (except in very young) is convoluted in the keel of the sternum or breast bone (fig. 38).

(e) As with the Geese, the annual moult consists of a single post-nuptial moult during which the flight-feathers are shed simultaneously and the birds become flightless for a while (Ducks have a double moult or one complete and one partial moult).

(f) Feed, like the River and Pond Ducks, by tipping and dabbling in shallow places.

GEESE

Subfamily *Anserinae*

There are, distributed throughout the world, about 35 forms of Geese, of which 15, including one visiting Old World species, the Barnacle Goose, are regularly found in North America.

Geese form a natural connecting link between Swans and Ducks, the length of neck and the size of body being generally intermediate between the two.

The following features characterize this Subfamily:

(a) In most species, as in the Swans, the sexes are alike in colour; the body

is raised and not so much flattened as in the Ducks; the neck is longer than in the Ducks, but is shorter than the body, and has less than 20 vertebrae (Swans have from 22 to 25).

(b) Bill is high at base, narrow in middle and tapering toward end; in some species, the bill appears open on the sides exposing the lamellae or tooth-like serrations. The lores (the space between the eye and the bill), unlike those of the Swans, are completely feathered; unlike the Ducks, they lack the cere or soft swollen surface at the base of the upper mandible present in some species.

(c) Tarsi, like those of the Swans, are reticulate all around, that is, covered uniformly with small hexagonal scales (scutellate in

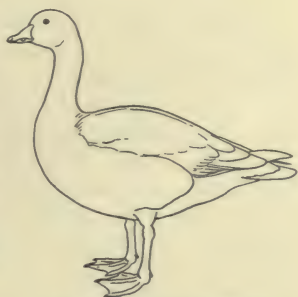


FIG. 3.—Typical goose



FIG. 4.—Foot and bill of goose, showing reticulate tarsus

Ducks); the hind toe, as in the Pond Ducks, has no flap or lobe; the legs are placed nearer the middle of the body than in the Swans or the Ducks, and the birds are better able to walk on land.

(d) Windpipe, unlike that of some Swans but like that of the Ducks, is simple, that is, not convoluted in the breast bone.

(e) Being better walkers than Swans and Ducks, they feed more on land, and are largely vegetable feeders; when feeding in the water, they do so, like Swans and Pond Ducks, by tipping in shallow places.

(f) The annual moult, like that of the Swans, consists of a single postnuptial moult (Ducks have a double moult), during which the flight-feathers are shed simultaneously and the birds are flightless for a while.

DUCKS

Ducks differ from Swans and Geese in the following respects:

(a) They are generally smaller; the necks are shorter, the body usually longer than the neck; sexes usually are not alike in colour.

(b) Bill is broad and flat but extremely variable.

(c) Tarsi are scutellate, that is, fitted with overlapping scales along the front edge, whereas in the Swans and Geese the tarsi are reticulate, that is uniformly covered with small hexagonal scales; the legs are proportionately shorter (except in the Tree Ducks) and are placed further back than in the Geese; the walk is a characteristic waddle.

(d) The eggs are usually more numerous; the progressive increase of down in the nest as the eggs are laid is characteristic of Ducks.

(e) Ducks feed less by grazing on land than do Geese.

(f) The lower end of the windpipe is variously modified in the males of all Ducks to form a voice-box (fig. 32).

(g) The annual moult is not a single moult like that of the Swans and Geese, but consists of what might be termed a double postnuptial moult, during which the male, for a short while, assumes a dress similar to that of the female ("eclipse" plumage, described elsewhere), but the flight-feathers, like those of the Swans and Geese, are shed simultaneously, with the result that the birds are flightless for a while.

The ducks of North America other than the Mergansers, the Ruddy Duck group and the Tree Ducks, fall naturally into two subfamilies as follows:

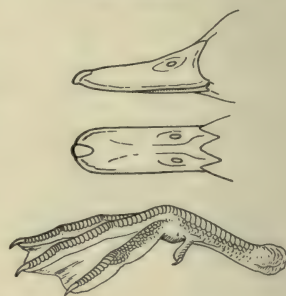


FIG. 5.—Typical foot and bill of duck, showing scutellate tarsus

RIVER AND POND DUCKS or SURFACE-FEEDING DUCKS

Subfamily *Anatinae*

There are, distributed throughout the world, about 100 forms of Surface-feeding Ducks, of which 16, including the visiting European Widgeon and the European Teal, are found regularly in North America.

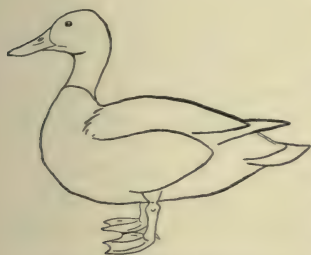


FIG. 6.—Typical Surface-feeding Duck

The characteristics which separate the ducks of this Subfamily from the Diving Ducks and Mergansers are:

(a) These are fresh-water ducks of the interior; feed in the shallow waters by tipping and by dabbling along the edges of lakes, ponds and smaller bodies of water; rarely dive except to escape danger; eat in general more vegetable matter; and are, with few exceptions, more palatable.

(b) Both the Surface-feeding Ducks and the Diving Ducks have the bill broad and flat and the lamellae file-like or comb-like; the Mergansers have the bill narrow and cylindrical and the lamellae saw-toothed.

(c) The hind toe of the Surface-feeding Ducks is small and without the flap or lobe present in the Diving Ducks and Mergansers; the feet are generally smaller than in the Diving Ducks; the legs are placed somewhat nearer the centre of the body.

(d) The speculum, or coloured patch on the secondary flight-feathers, is generally highly coloured and iridescent, more so than in the Diving Ducks.

(e) In rising from the water or land the ducks of this Subfamily do so with a strong, vertical, upward bound, whereas most of the Diving Ducks and Mergansers patter along the surface for some distance before clearing.

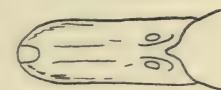


FIG. 7. — Typical bill and foot of Surface-feeding Duck, showing hind-toe without lobe

BAY, SEA or DIVING DUCKS

Subfamily *Nyrocinæ*

There are, distributed throughout the world, about 43 forms of Diving Ducks, of which 20 are found regularly in North America.

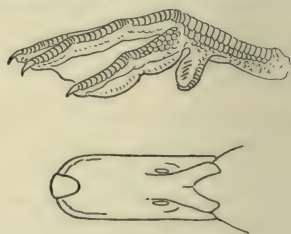
FIG. 8.—*Typical Diving Duck*

and the lamellae are rigid and sharp-pointed.

(c) These ducks and the Mergansers are instantly distinguished from the Surface-feeding Ducks in that the hind toe has a pronounced flap or lobe, which is lacking in the River and Pond Ducks; the tarsi are shorter and therefore these ducks are less adept at walking on land; the feet, like those of the Mergansers, are larger than those of the Surface-feeding Ducks; the legs are set further back on the body, thereby increasing ability in diving and swimming.

(d) The speculum, or coloured patch on the secondary feathers, is less bright in the Diving Ducks and Mergansers, and generally lacks the iridescence of that of the River and Pond Ducks.

(e) In rising from the water or land most ducks of this Subfamily patter along the surface for some distance before clearing, whereas the River and Pond Ducks leave the water with a strong, vertical, upward bound.

FIG. 9.—*Typical bill and foot of Diving Duck, showing hind toe with lobe*FIG. 10.—*Typical Merganser*

The characteristics which separate this Subfamily from the Surface-feeding Ducks and Mergansers are:

(a) The Diving Ducks are, generally, frequenters of the larger inland bodies of water and of the sea coasts; they feed by diving, often seeking their food at considerable depths; the food is generally less vegetable and in many cases consists mainly of molluscs, shell-fish and comparatively deep-water aquatic plants; with few exceptions, the flesh is less desirable than that of the Surface-feeding Ducks.

(b) Both the Diving Ducks and Surface-feeding Ducks have the bill broad and flat; it is narrow and cylindrical in Mergansers,

MERGANSERS

Subfamily *Merginae*

There are distributed throughout the world, chiefly in the Northern Hemisphere, nine forms of Mergansers, of which three are regularly found in North America.

This Subfamily is characterized by the following features:

(a) The duck-like form is modified to more slender and stream-lined proportions to give increased ability for underwater

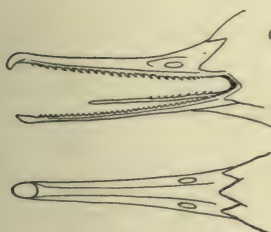


FIG. 11.—Typical bill and foot of Merganser, showing scutellate tarsus and hind toe with lobe

movement in the pursuit of prey; the head is more or less crested; feed almost exclusively on fish.

(b) The bill is especially constructed for seizing and holding live, active, and slippery prey; the bill is narrow, cylindrical, and slender, compared to that of other Ducks; the lamellae, or tooth-like serrations at the edges of the mandibles, are highly developed, rigid, sharp-pointed, and generally inclined backwards; the "nail" at tip is hooked.

(c) The tarsi, as in all the true ducks, are scutellate, that is, with overlapping scales on the front edge; the hind toe has a lobe or flap as in the Diving Ducks; the feet are large and broadly webbed; the legs are placed well to the rear, as in the Diving Ducks (but not so far back as in Loons or Grebes); the gait on land is awkward and laboured.

(d) Lower end of windpipe of males (true of males of all other ducks) is modified to form a voice-box (fig. 32); all species show some white on the wings in flight, and the flight is seldom high above the water.

RUDDY DUCK GROUP

Subfamily *Erismaturinae* (*Oxyurinae* of Peters)

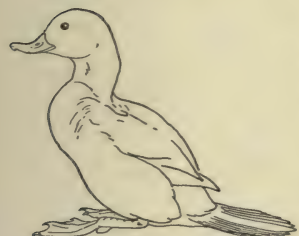


FIG. 12.—Typical Ruddy Duck

There are, in this Subfamily, seven forms of ducks distributed mainly throughout the southern portions of both hemispheres. One of these is regularly found in North America and another, the Masked Duck, visits this continent occasionally.

This Subfamily is characterized by the following features:

(a) These are freshwater ducks of small size and sedentary habits.

(b) Tail consists of stiff, spike-like feathers,

with coverts extremely short, barely covering the bases of the tail-feathers.

(c) Nail of bill, strongly hooked downward at the tip and very sharp-pointed.

(d) Legs, placed even further to rear of body than in the Mergansers and Diving Ducks; these birds are practically unable to walk on land; tarsi very short and scutellate; hind toe with lobe, as in Diving Ducks and Mergansers.



FIG. 13.—Typical foot and bill of Ruddy Duck

(e) Neck, thick in appearance, with curiously enlarged air-sac in the upper neck of the males.

(f) Eggs, usually numerous and relatively large in size.

TREE DUCKS

Subfamily *Dendrocygninae*

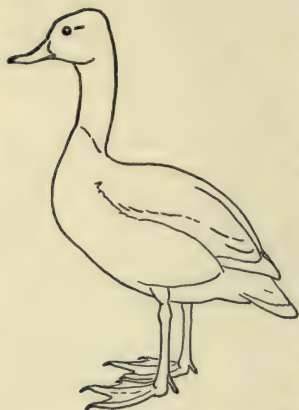


FIG. 14.—Typical Tree Duck

There are, distributed throughout the world, ten forms of Tree Ducks, of which two are found regularly in North America. Though a sharply differentiated group, these ducks seem to form a link between the Swans and Geese and the true Ducks, exhibiting characters found in all three groups.

This Subfamily is characterized by the following features:

(a) These are freshwater ducks of the interior; as in the Swans and Geese the sexes are alike in colour; feed by reaching down in shallow places (tipping) as do the Surface-feeding Ducks, but more generally by grazing on land as do the Geese; feed chiefly on vegetable matter and are very desirable table birds.

(b) Neck long, having 17 vertebrae.

(c) Legs and feet very long; as in the Swans and Geese, tarsi are reticulate all around, i.e., uniformly covered with small hexagonal scales (scutellate in Ducks); hind toe without lobe, as in the Surface-feeding Ducks and Geese; claws, long.

(d) As in the Ducks, the lower end of the windpipe in the male is modified to form a voice-box (fig. 32).

(e) Some species nest in trees, others on the ground.



FIG. 15.—Typical foot and bill of Tree Duck

OTHER SUBFAMILIES

Not Found in North America

Plectropterinae. Consists of three Geese, (a) a semipalmated (half webbed) Goose, with hind toe on level with other toes, found in Australia and New Guinea, and (b) two varieties of Geese with high frontal knob on bill, and spur on bend of wing, found in Africa.

Cereopsinae. Consists of one semipalmated Goose found in Australia.

Merganettinae. Consists of seven forms, all races of the same species which represents a link between the Mergansers and the Diving Ducks; they have no serrated bill as in the former, and possess a spur on the bend of the wing. All found in South America.

DUCK TOPOGRAPHY**See Glossary for definitions of terms employed**

The terms used in describing the birds of this family are illustrated in the following diagrams. Those readers who are not thoroughly familiar with ornithological expressions can readily become so by reading carefully one or two of the "descriptions," referring at the same time to this section, and to the Colour Plates of the birds being studied.

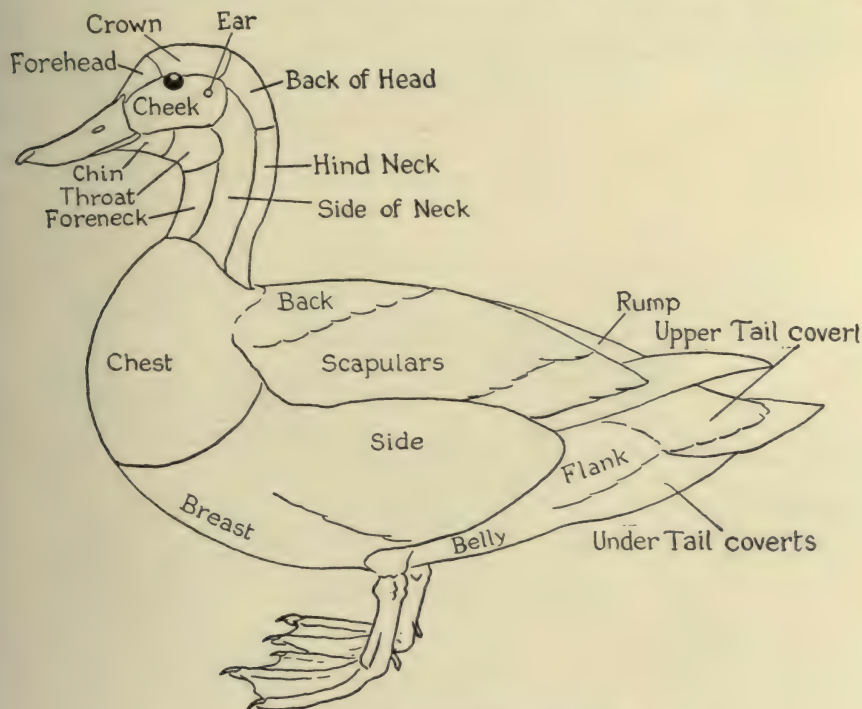


FIG. 16.—The topography of a duck

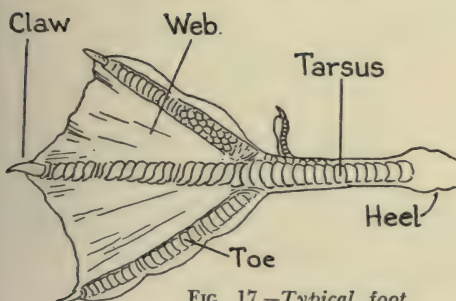


FIG. 17.—Typical foot

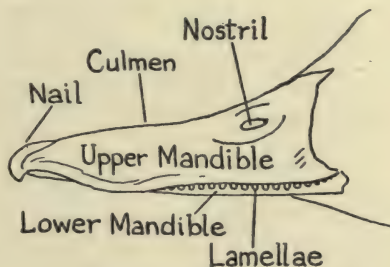


FIG. 18.—Typical bill

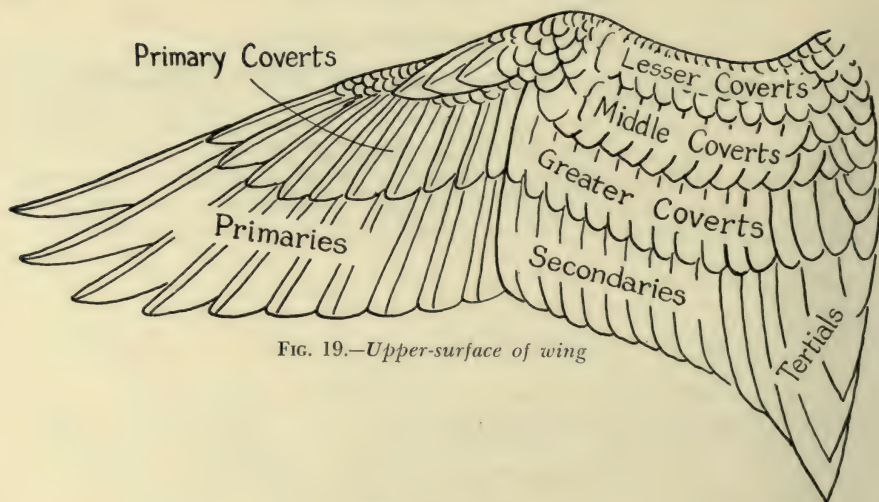


FIG. 19.—Upper-surface of wing

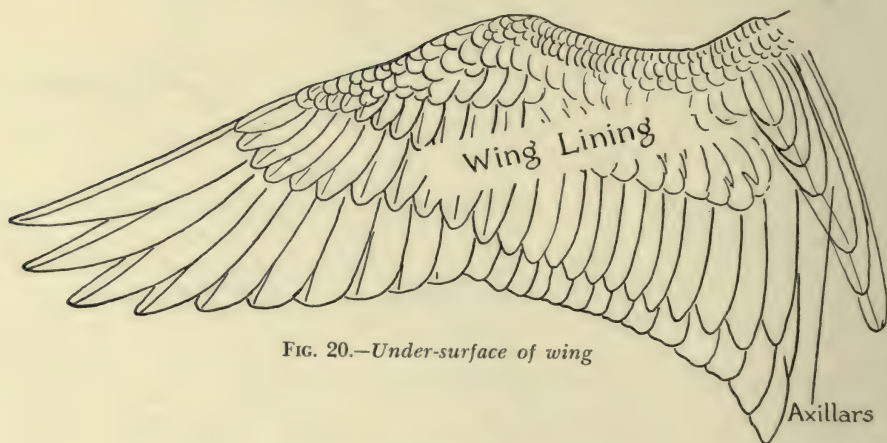


FIG. 20.—Under-surface of wing

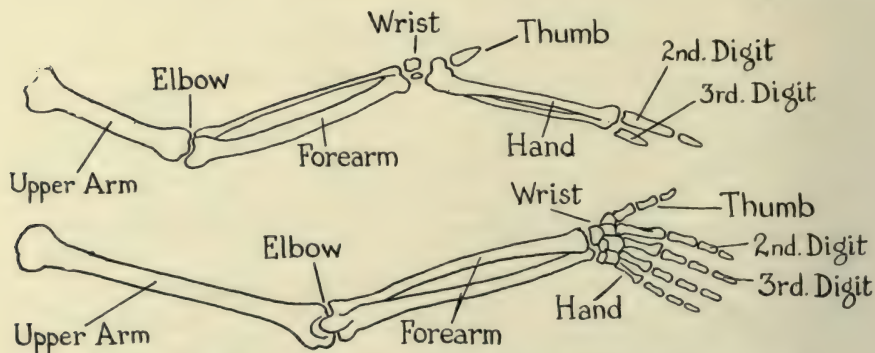


FIG 21.—Comparison of wing with human arm

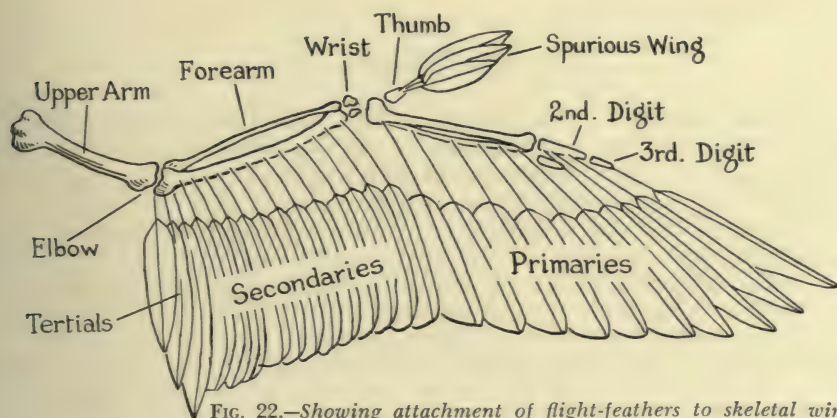


FIG. 22.—Showing attachment of flight-feathers to skeletal wing

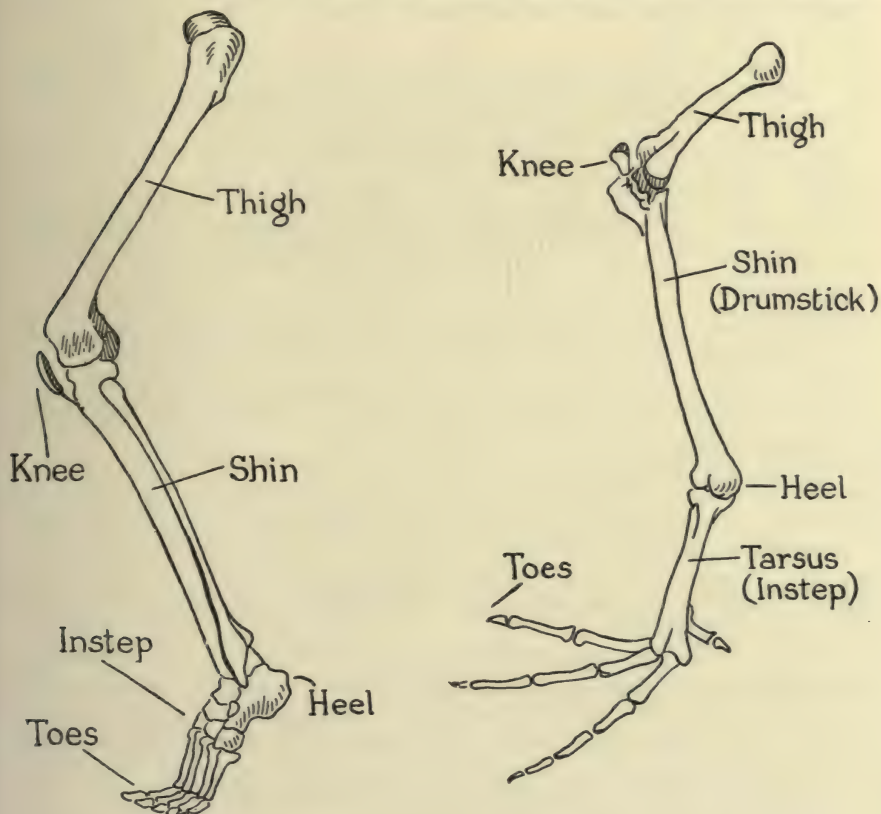


FIG. 23.—Comparison of leg of duck with human leg

GLOSSARY

A careful reading of the Glossary, and frequent reference to it, will greatly facilitate an understanding of the terms and expressions used throughout this work.

ADULT. Of breeding age, usually with fully mature plumage.

ALBINO. Affected with albinism; an abnormal condition in which white feathers replace those not normally white; caused by a deficiency of pigment in the plumage.

ALGAE. A group of plants including seaweed.

ANATIDAE. The family of Swans, Geese and Ducks.

ANATINAE. The subfamily of Surface-feeding, or River and Pond Ducks.

ANSERINAE. The subfamily of Geese.

ANUS. The vent.

A.O.U. CHECK-LIST. The check-list of North American Birds, prepared by a committee of the American Ornithologists' Union.

AQUATIC. Pertaining to or living in water.

ARBOREAL. Pertaining to or living in trees.

AURICULAR. The region of the ear.

AXILLARS. A fan-shaped group of feathers, usually elongated, under the wing, growing from the axilla or "armpit," and closing the space between the last flight-feathers and the body when in flight (fig. 20).

BACK. The area on the upper surface of the body included between the neck, rump, and wings (fig. 16).

BARS. Narrow transverse marks across the body or across a feather, and not parallel with the shafts of the feathers. ("Stripes" run lengthwise.)

BASE OF BILL. That part of the upper mandible nearest the head.

BEND OF WING. The second joint, or "elbow" of the wing (fig. 21).

BREAST. An area on the under surface of the body between the chest or upper breast, and the belly or abdomen (fig. 16).

CERE. The soft, swollen area at the base of the upper mandible, present in some species.

CHEEK. The area on the side of the head, below the eye, above the chin and throat, extending from the forehead to include the ear region. This area may be divided into lores, cheek, and ear region (fig. 16).

CHEST. The upper breast; the area between the base of foreneck and the breast (fig. 16).

CHIN. The area on the under side of the head at the base of the lower mandible (fig. 16).

CLAW. The nail at the terminal joint of any toe.

CLOACA. A cavity in birds and reptiles in which the intestinal and urinary ducts terminate.

CLUTCH. A complete set of eggs; a brood of chicks.

CONVOLUTIONS. Coils; twists; folds.

COVERTS. (Wing coverts). The feathers covering the bases of the flight feathers; those of the upper surface of the wing are called the upper wing-coverts, and those on the underside of the wing are called the under wing-coverts or wing "lining;" the upper coverts are divided into the lesser, middle, and greater coverts (fig. 19). (Tail coverts). The feathers covering the bases of the tail-feathers; there are upper tail-coverts and under tail-coverts (fig. 16).

CREST. A more or less lengthened group of feathers on the top of the head, permanently erected or capable of being erected at will.

CROWN. The top part of the head, between the forehead and the back of head or occiput (fig. 16).

CRUSTACEAN. (pl. crustacea or crustaceans). One of a class of water-breathing animals, including the water fleas, barnacles, shrimps, crayfish, etc.

CULMEN. The upper ridge or profile of the bill; measured in a straight line from the first forehead-feathers to the tip of the bill (fig. 18).

CYGNET. A young swan.

CYGNINAE. The subfamily of Swans.

DECURVED. Bent downward.

DENDROCYGNINAE. The subfamily of Tree Ducks.

DORSAL. Pertaining to the back.

EAR COVERTS. The feathers overlaying the ear; auriculars (fig. 16).

ECLIPSE PLUMAGE. Term applied to the plumage attained by the incomplete postnuptial moult of most male ducks (see section on "Moult and Plumages").

EMARGINATE. Having part of one web of a feather abruptly narrower than the rest, as if partly cut away.

ERISMATURINAE. The subfamily to which belongs the Ruddy and Masked Ducks (*Oxyurinae* of Peters).

EVERT. To turn inside out.

EVOLUTIONS. Wheeling about; erratic movements in flying.

FAMILY. In ornithology, a group of kinds of birds having enough mutual resemblance and relationship to be classed together, and apart from all other birds.

FAUNA. The animal life of a region.

FLANKS. The hindmost part of the sides of the body, between the rump and belly (fig. 16).

FOOT. See Tarsus.

FOREHEAD. The area between the base of the upper mandible of the bill and the top-of-head or crown (fig. 16).

FORE-NECK. The front part of the neck, between the throat and the chest (fig. 16).

FORMS. As used herein, meaning "kinds," embracing species and sub-species.

FRONTAL. Pertaining to the forehead.

GAPE. The width of the mouth when open.

GENUS (pl. genera). In ornithology, a group of birds within a family or subfamily, consisting of a number of species which are closely related.

GLAUCOUS. Of a whitish-blue or whitish-green colour.

GREATER COVERTS. The hindmost row of the upper wing-coverts, overlying the bases of the secondaries and tertials; the tips of these form a border in front of speculum (fig. 19). The outer webs of these feathers are exposed, the same being true of the lesser coverts, whereas in the middle coverts, the inner webs are exposed.

GREGARIOUS. Living in flocks or communities; fond of company.

HABITAT. Natural abode; the kind of environment in which the bird occurs.

HIND-NECK. The middle of the neck behind (fig. 16).

HINDPARTS. The hindquarters; those parts of the body towards the rear.

HYBRID. The offspring of parents of different species; a cross.

IMMACULATE. Unspotted; unmarked.

IMMATURE. Not adult, even though full-grown; juvenile.

INTERSCAPULARS. The feathers in the middle line of the back between the scapulars or shoulders.

IRIDESCENT. With bright, changeable colours or tints in different lights.

IRIS. The coloured part of the eye surrounding the black pupil.

JUVENILE. Not adult, even though fully grown; immature.

JUVENILE PLUMAGE. The plumage following the downy plumage and preceding the adult plumage; the first feathered plumage (see section on "Moult and Plumages").

LAMELLATE. Having tooth-like serrations, as the edges of a duck's bill.

LATERAL. At or towards the side.

LEG. See Tarsus.

LENGTH. Measured from the tip of the bill to the end of the longest tail-feather, the bird being laid flat on its back and stretched just sufficiently to straighten out the curves of the neck.

LESSER COVERTS. The several rows of small covering feathers of the outer surface of the wing, from the bend of the wing to the side of the body, and forward of the middle coverts (fig. 19); as with the greater coverts, the outer webs of these feathers are exposed, whereas in the middle coverts the inner webs are exposed.

LINING OF WING. The under wing-coverts; the feathers on the under surface of the wing covering the bases of the flight-feathers (fig. 20).
LOBE. The membrane-like flap on the hind toe of some ducks (fig. 9).
LORES. The space between the eye and bill.
LOWER TAIL-COVERTS. The under tail-coverts.

MALAR REGION. The cheek region.

MANDIBLES. The two members forming the bill; there is an upper and a lower mandible.

MELANISM. The opposite of albinism. An unusual development of black or nearly black plumage. A melanistic bird is said to be a melano.

MERGINAE. The subfamily of Mergansers.

MIDDLE COVERTS. The two rows of upper wing-coverts lying immediately forward of the greater coverts (fig. 19); the inner webs of the middle coverts are exposed, whereas in the greater and lesser coverts the outer webs are exposed.

MOLLUSC. A shellfish such as a clam, oyster, whelk, snail, etc.

MOULT. The periodic shedding or casting of the feathers.

NAIL (of bill). The rounded and slightly raised portion on the tip of the bill. (Of toe). See **CLAW**.

NAPE. The upper part of the hind-neck just below the base of the skull (fig. 16).

NUCHAL. Relating to the nucha or nape.

NYROCINAE. The subfamily of Bay, Sea or Diving Ducks.

OBSCURE. Indistinct; ill-defined.

OCCIPUT. The back of the head.

OLIVACEOUS. Of an olive-green colour.

ORNITHOLOGY. The branch of zoology which treats of birds; the science of birds.

OXYURINAE. See *Erismaturinae*.

PELVIS. The bony structure enclosing the lower abdominal cavity.

POLYANDRY. The habit of having more than one (male) mate at the same time.

POLYGAMY. The habit of having more than one (female) mate at the same time.

POSTNUPTIAL. Occurring after the breeding season.

PRIMARIES. The outermost and longest series of flight-feathers of the wing, attached to the "hand" or first section of the wing between the "wrist" and the tip (figs. 19 and 22). In this work the designation "first" primary has reference to the outermost, fully-developed member of the primary feathers; actually, however, the first primary is a rudimentary feather about an inch in length, spike-like in form and known as the "remicle."

PRIMARY COVERTS. The series of covering feathers overlying the bases of the primaries.

RACE. See SUBSPECIES.

REMICLE. See PRIMARIES.

RETICULATE. Netted; resembling network.

RUFIOUS. Of a red or reddish colour.

RUMP. The lower portion of the back, lying just forward of the base of the tail (fig. 16).

SCALES. The small horny plates on the tarsus or foot of a bird.

SCAPULARS. The group of feathers on either side of the back, on the "shoulder" just above the wing (fig. 16).

SCAPULAR REGION. The shoulder region.

SCUTELLATE. Like a plate or shield.

SECONDARIES. The series of flight-feathers attached to the second joint or "forearm" of the wing, and forming a series continuous with that formed by the primaries (figs. 19 and 22).

SHAFT. The quill or midrib to which the two webs of a feather are attached.

SIDE. The area on each side of the body between the armpit and flank, and the back and breast (fig. 16).

SPECIES. A group of individuals within a genus having common characteristics and relationships.

SPECULUM. The brightly coloured area on the secondary wing-feathers of many of the ducks, often showing a metallic iridescence (fig. 19).

STERNUM. The breast bone. In a bird, a deeply-keeled structure to which the wing muscles are attached.

STREAK. Same as stripe.

STRIPE. A line of contrasting colour running lengthwise of a feather or of the body. ("Bars" run crosswise.)

SUBSPECIES. A division of a species; a geographic subdivision of a species; also called "variety" or "race."

TAIL-COVERTS. The feathers which cover the bases of the tail-feathers; there are upper and under tail-coverts (fig. 16).

TARSUS (pl. tarsi). The foot; that portion from the "heel" to the base of the toes (fig. 17). The tarsus is popularly referred to as the "leg" but that this is incorrect will be seen from fig. 23, in which comparison is made with the human leg. The tarsus corresponds to the human instep, but the bones thereof are fused into a single bone.

TERTIALS. The innermost series of flight-feathers. The tertials or tertiaries are, properly, the feathers which grow on the upper arm (humerus), but such feathers are not very evident in most birds and the two or three innermost secondaries, growing upon the elbow, and commonly different from the rest in form or colour, pass under the name of tertials (figs. 19 and 22).

THROAT. The area on the underside of the head between the chin and foreneck (fig. 16).

TIBIA. The part of the leg next above the tarsus; the "drum-stick;" the tibia corresponds to the "shin" of the human leg (fig. 23).

TRACHEA. The windpipe.

TRANSVERSE. Crosswise.

TULE (pronounced tu-lee). A form of bulrush, a round-stemmed, reed-like plant growing in an aquatic habitat.

TYPE FORM. See explanation in section on "Scientific Nomenclature."

UNDERPARTS. Those parts of the body below a line drawn along either side from the corner of the mouth to the side of the tail.

UNDER TAIL-COVERTS. The feathers covering the bases of the tail-feathers below; the *crissum*.

UNDER WING-COVERTS. The wing "lining"; the feathers covering the bases of the flight-feathers on the underside of the wing (fig. 20).

UPPERPARTS. Those parts of the body above a line drawn along either side from the corner of the mouth to the side of the tail.

UPPER TAIL-COVERTS. The feathers covering the bases of the tail-feathers above (fig. 16).

UPPER WING-COVERTS. The feathers covering the bases of the flight-feathers above (fig. 19). See Greater, Middle, and Lesser coverts.

VADE MECUM (Latin) Go with me; a constant companion.

VARIEGATED. Marked with different colours.

VERMICULATIONS. Fine, irregularly wavy lines, like pathways of innumerable worms, from which the word is derived.

VERTEBRA (pl. *vertebrae*). A single section of the backbone.

VINACEOUS. Wine-coloured.

VISCERA. The internal organs of the body.

VISITOR. A bird found regularly or irregularly, but not permanently, in a certain district.

WEB (of feather). That part of the vane of a feather on either side of shaft.

(between toes). A membrane-like extension of skin between the front toes in all Ducks, Geese and Swans (and in certain other birds).

WING-COVERTS. See **COVERTS**.

SCIENTIFIC NOMENCLATURE

It is very simple and extremely important.

The reader's enjoyment, and the knowledge he will derive from this book, will be tremendously increased if he will devote a few minutes of his time to an understanding of the "whys" and "wherefores" of the nomenclature used in ornithology. Half of the pleasure which he might derive from the study of our Ducks, Geese and Swans, will be lost to him, should he fail to do so. And it is very simple.

Fear of the long and apparently unpronounceable names is apt to frighten the beginner, and may discourage him before he starts; but that is simply because the names are new to him. Such words as hippopotamus, rhinoceros, and eucalyptus, are not frightening because of their familiarity but they are, strictly, scientific names in Latin. The scientific names of very few of our Ducks are as difficult as these.

It is not, however, an ability to pronounce the names that matters. That is of minor consequence. It is not even necessary to try to pronounce them, though it is easier to do so than appears at first glance, and a simplified pronunciation is given in this work in conjunction with the description of each bird. The prime importance of the study of scientific names is to obtain an understanding of the relationships recognized between the species. And that is important, vitally so; and adds greatly to the interest of the subject.

Reference will now be made to the "Family Tree" of the Ducks, Geese, and Swans. The manner in which the "Family" is divided into seven "Subfamilies" is clearly set out on this chart. The Subfamily is, in turn, further divided, as will now be explained, by the scientific names, and that is why an understanding of the scientific nomenclature is essential.

The scientific names of birds, it will be observed, consists of either two or three terms, and these indicate the relationships which exist between (a) the Genus (plural Genera), (b) the Species, and (c) the Subspecies. The first term in the scientific name denotes the GENUS; the second term denotes the SPECIES; the third term denotes the SUBSPECIES. The reason why it is necessary to have sometimes two or sometimes three terms to each scientific name will be made clear by the following simple, homely example. Let us think of dogs.

If you tell your friend that you have a dog, you tell him the GENUS (let us say) of your pet, but that is all. He will immediately ask what *kind of a dog* it is, because he wants to know the SPECIES. If you say that it is a Pekinese, he then knows exactly, because there is only one kind of Pekinese with which he is familiar. You have now told him the genus and the species of your pet. (If your Pekinese were a duck, its scientific name would consist of two terms, and might possibly be *Dogus Pekinesi*, meaning genus-dog, species-Pekinese.) This is an example of a scientific name of two terms.

If, however, you had said that your dog was a setter, this would not be sufficient as there are several varieties or subspecies of setters, and your friend would be forced to ask, what *kind of a setter*? If you reply that it is an English setter, then you tell him the variety or SUBSPECIES of setter you own, and his information regarding your pet would be complete. (If your English setter were a duck, its scientific name would consist of three terms, and might possibly be *Dogus setteri englishus*, meaning genus-dog, species-setter, variety or subspecies-English.) This is an example of a scientific name of three terms.

It should now be clear why it is that in certain instances a two-termed (binomial) scientific name is sufficient, while in others a three-termed (trinomial) name is necessary. The answer is, EXACTITUDE.

(Lest we be charged with ignorance, and to be fair to the dog, it should be admitted now that in his own family, he is a species, not a genus. Thanks, Fido!)

Let us now translate our "dog" example into a "goose" example by examining the Subfamily "Geese" on the chart, and see how the Geese are divided into GENERA, SPECIES, and SUBSPECIES by their scientific names. There are fifteen geese of this subfamily known from North America and their relationships to one another are as follows:

THE FIRST TERM of the scientific name, as we know, denotes the GENUS. The first eight geese, for example, are of the genus *Branta*; there follows one of the genus *Philacte*, two of the genus *Anser*, and four of the genus *Chen*. So that all the Geese in North America are included in the four genera, *Branta*, *Philacte*, *Anser* and *Chen*, all indicated by the first term of the names.

THE SECOND TERM of the scientific name, as we know, denotes the SPECIES. The first five geese, for example, are of the species *B. canadensis*, (the second term); there follows one of the species *B. bernicla*, one of the species *B. nigricans*, one of the species *B. leucopsis*, one of the species *P. canagica*, two of the species *A. albifrons*, two of the species *C. hyperborea*, one of the species *C. caerulescens*, and one of the species *C. rossii*; all indicated by the second term of the names.

THE THIRD TERM of the scientific name, as we know, denotes the SUBSPECIES. When a species is composed of more than one variety, each variety is called a "subspecies," and a third term is added to the name to denote the name of each such subspecies. It has already been noted that the first five geese belong to the species *B. canadensis* (the second term) and it is now seen that this species, for example, is composed or built up of five varieties or subspecies, viz., *B.c.canadensis*, *B.c.occidentalis*, *B.c.leucopareia*, *B.c.hutchinsi*, and *B.c.minima* (the third term).

It will now be clear to the reader that (1) a species may consist of only one kind of bird, as in the case of the Wood Duck, *A. sponsa*, in which case the single specific name *sponsa* is sufficient, or (2) a species may be divided into or composed of more than one variety or subspecies,

sometimes many, as in the case of the first five geese, *B. canadensis*, in which case a subspecific or third name must be added as the name of each of the slightly different geographic races.

(In the case of the American Brant, *Branta bernicla hrota*, the use of the third term, *hrota*, implies the existence of more than one subspecies in the species *B. bernicla*; and this is the case, but the others are not listed here as they are exclusively Old World varieties and do not come within the scope of this work.)

The foregoing explanation should be re-read carefully to make certain that it is fully understood. The reader is then advised to check over carefully the other subfamilies and work out for himself how they, in turn, are subdivided into genera, species and subspecies.

The words Family, Subfamily, Genus, Species, and Subspecies, which have been used above, will now be defined briefly:

FAMILY. A group of birds, having enough mutual resemblance to be classed together and apart from all other birds. All the Swans, Geese, Ducks and Mergansers, for example, belong to the same Family, *Anatidae*.

SUBFAMILY. A group of birds within a Family, having enough mutual resemblance to be classed together and apart from those of the other Subfamilies. For example, (a) the Swans, *Cygninae*, (b) the Geese, *Anserinae*, (c) the Diving Ducks, *Nyrocinæ*; etc.

GENUS (plural, genera). A group of birds within a Subfamily, consisting of a number of species which are closely related. The genus *Nyroca*, for example, in the Subfamily of Diving Ducks, which comprises five closely related species. Note: A Genus may also consist of but a single member; the Genus *Philacte*, for example, of the Subfamily of Geese.

SPECIES. A group of individuals, within a Genus, having common characteristics. The species *canadensis*, for example, within the Genus *Branta*, in the Subfamily Geese. Note: A species may also consist of but a single member; for example the species *leucopsis* (Barnacle Goose), within the genus *Branta*, of the Subfamily of Geese.

SUBSPECIES. A division of a species: a distinguishable form being part of a species; also called a "variety" or a "race." A subspecies is divisible only into individuals; the subspecies *borealis*, for example, of the species *S. mollissima*, the Northern Eider.

EXAMPLES. (a) The Cackling Goose is the subspecies *minima*, of the species *canadensis*, of the genus *Branta*, of the subfamily *Anserinae*, of the family *Anatidae*. (b) The Ruddy Duck is the subspecies *rubida*, of the species *jamaicensis*, of the genus *Erismatura*, of the subfamily *Erismaturinae*, of the family *Anatidae*. (The other subspecies of the species *jamaicensis* do not visit North America.) (c) The Canvas-back is the species *valisineria*, of the genus *Nyroca*, of the subfamily *Nyrocinæ*, of the family *Anatidae*.

It will have been noticed that the name of a Genus is referred to as

its "generic" name; that of a species, as its "specific" name; and that of a subspecies, as its "subspecific" name.

A species not divided into subspecies is referred to by its specific name and, when written, the specific name is preceded by the capital letter denoting its Genus; e.g., *C. rossi* (Ross's Goose). A species divided into subspecies is also referred to by its specific name, when reference to the whole group is intended. *B. canadensis*, for example, refers to all five geese in the group of that species. A subspecies is referred to by its subspecific name, which when written is preceded by the first letter of both its Generic and its specific name; e.g., *A. a. gambelli* (The Tule Goose).

It will now be clear that the complete scientific name of a bird consists of a combination of its Generic and specific (and subspecific) names. In writing the name, the use of initial letters, as explained in the preceding paragraph, is for convenience and brevity. The Generic name is always written (or abbreviated) with a capital letter, the specific and subspecific names with a small letter.

THE TYPE FORM. It will be observed that the subspecific name of a bird is sometimes the same as the name of the species; e.g., *Anas fulvigula fulvigula* (The Florida Duck). This is because when the species was first described it consisted of only one member, *A. fulvigula*. Later, when another variety or subspecies was discovered and distinguishing names had to be provided for both varieties, the original bird was honoured by receiving, as its subspecific name, the name of the species, and became known as the "type" form of the species, and generally considered "typical" of the species, though not necessarily so.

The scientific names are generally of Greek or Latin origin, or are Latinized forms of modern words or names; they usually have reference to some habit or characteristic of the bird. The meanings and pronunciations of the scientific names are given in conjunction with the description of each species or subspecies and are of great interest. In ornithology, the name of the Family always terminates in *-idae* (*Anatidae*), and the names of the Subfamilies end in *-inae* (*Anserinae*, *Merginae*).

STANDARDIZED NOMENCLATURE. Final agreement on the subject of nomenclature has not been reached. Authorities differ in their views of the relationship which exists between certain species. The nomenclature adopted by the American Ornithologists' Union (1931) as well as that of J. L. Peters in his Check List of Birds of the World (1931) is quoted, both on the Family Tree Chart and throughout the text of this work.

MOULTS AND PLUMAGES**MOULTS OF THE DUCKS****MOULTS OF THE ADULT MALE****THE "ECLIPSE" PLUMAGE**

In the early summer, as soon as the females are well established in their incubation duties, the males of most of the ducks desert them, gather into flocks by themselves, and proceed to moult their bright winter plumage.

During this moult, the brilliant plumage of the males is gradually replaced by a somber, inconspicuous dress, which, in most cases, is almost identical with that of the adult female. This plumage is known as the "eclipse" plumage.

The moult which results in the eclipse plumage is known as the "post-nuptial" or "eclipse" moult. It consists of a complete moult of the body-, tail-, and wing-feathers.

When the drake Mallard, for example, is in full eclipse, no trace whatever remains of the bright green head, chestnut chest, or plain grey breast and sides; all these bright colours and distinctive markings have been exchanged for a plumage which is identical with that of the drab-looking female. This female-like eclipse plumage is worn for about one month. While this moult is at its height, the males lose their flight-feathers; these are shed simultaneously and the birds are rendered flightless until the flight-feathers are replaced. The wing-feathers of the male, which are shed during the eclipse moult, are renewed unchanged in colour and form, the wing being the only feature which does not take on the aspect of that of the female.

No sooner have the flight-feathers grown in again, than the drakes commence a second moult, during which the female-like plumage of the eclipse is gradually replaced by the brilliant colours of the full winter plumage. This second moult is usually started by about the beginning of September, and takes a considerable time to complete. Thus it is in the more northern climes, that in the autumn (the gunning season), adult males are never seen in the full winter plumage, but instead, are found in various stages of moult toward the resplendent winter dress.

This autumn moult, which results in the full plumage of the drake, is known as the "pre-nuptial" moult. In this work it is described as the "autumn plumage," but actually it is a prolonged moult. It is a partial moult only, as the wing-feathers, renewed during the eclipse, are not again moulted; it does, however, concern the rest of the plumage including the tail.

The startling nature of the phenomenon of the eclipse moult is illustrated on Colour Plate No. 6 (which see), in which the Mallard drake is shown in various stages of the moult out of eclipse.

Another illustration of the completeness of the imitation of the female plumage by some species, will be seen by reference to Plates 28 and 29, where it will be observed that the American Merganser, himself without crest, assumes a crest, as in the female, during the eclipse. On Plates 11 and 17, it will be seen that even the bills of some species change colour, as illustrated on these Plates by the Gadwall and the Shoveller.

The eclipse moult is peculiar to the Ducks, and is exhibited in no other kind of bird. Strangely enough the eclipse is present only in the ducks of the Northern Hemisphere, not being found in those of the Southern Hemisphere, even in those countries where the climate is similar to that of the North, and even in ducks of the same species, such as the Cinnamon Teals of North and South America.

Much variation exists in the extent of the eclipse moult. In some species the change into the female-like dress is complete, as has been described in the case of the Mallard and the American Merganser. In others, the eclipse plumage more closely resembles the dress of the juvenile male. Yet again, it may be somewhat of a mixture of the female and juvenile-male-type dress. However, the appearance, in general, is very much like that of the adult female.

The eclipse is practically complete in all of the River and Pond Ducks. It is less complete in the case of the Diving Ducks, in which some traces of the winter plumage are retained. In those ducks in which the sexes are very similar, such as the Black Ducks and the Scoters, it is obvious that there *can* be no eclipse moult in the sense that "eclipse" is a change into a more sombre, female-like plumage. In such cases there is a partial prenuptial moult, and a complete postnuptial moult of both sexes, during which very little seasonal change in plumage is apparent (see eclipse plumage of Black Duck).

There is great variation in the dates of the flightless period; in general it would be safe to say that the flightless season for River and Pond Ducks is between the first or second week in July and early August; with Diving Ducks the peak of the flightless season is between the last of July and the end of August.

The Old-squaw and Ruddy Duck have distinct and different plumages for both winter and summer. Some ornithologists claim that the winter plumage of the Old-Squaw is its nuptial or breeding plumage, and its summer plumage is really a prolonged eclipse plumage. It is also held that the female-like winter plumage of the Ruddy is a prolonged eclipse plumage.

Whether the eclipse plumage represents a return to some primitive ancestral plumage, in which the sexes were alike, or is a more recently adopted, specialized development to render the male less conspicuous during the flightless period, is a matter for discussion, even among experts. Whatever the true explanation of the phenomenon of "eclipse" may be, it remains a feature in which Ducks differ from all other classes of birds.

MOULTS OF THE ADULT FEMALE

During the winter and spring, the adult female undergoes a gradual and inconspicuous moult, including the body-feathers and tail but not the wings. The feathers are replaced by others which are identical with those moulted. This moult is known as the "prenuptial" moult. (In the case of the Scaups and Ring-necks the plumage becomes browner during the breeding season, even the white mask becoming brown or at least much obscured.)

Towards the end of this moult the female sheds her inner coat of down, which, in waterfowl, is found most abundantly on the underparts. This down is immediately replaced by a similar coat and, in addition, the female is now provided with a special "nest down." This nest down is longer, softer, and more strongly constructed. As its name implies, it is chiefly this special down that the female plucks from her breast to line her nest.

In the late summer the female undergoes another moult of the entire plumage, this time, including the wings. This moult is known as the "post-nuptial" moult, and is complete in August or September; thus it is that the female, during the autumn, is found in her full, new, winter plumage.

JUVENILE PLUMAGE

Usually within a period of three weeks after hatching, the downy young commences to acquire its first true feathers known as the "juvenile" plumage. The wing-feathers are the last to appear, the young bird being then about 3 months old and practically fully grown.

Very shortly after the juvenile plumage has been completed (usually in August or early September), the young bird commences to moult into its "first winter" plumage. This is acquired in typical ducks, by a continuous moult between September and May.

In the autumn, therefore, the young birds are found in various stages of the moult from juvenile to fully adult dress, and, as the season progresses, they become more and more like the adult birds. The juvenile wing is not moulted until after the first eclipse moult during the following summer, when the young bird is about one year old. In most cases, the plumage of the young bird becomes fully adult following its first eclipse moult, when about 15 months old.

During the first autumn, young males resemble adult males moulting out of eclipse (except for the wings), and young females are practically identical with adult females. Up to late autumn or early winter, juveniles may be distinguished from adults by methods described in the section headed "Sex and Age Determination."

The rate of the moult from juvenile to adult plumage varies greatly in the various species, and even in individuals of the same species. The Eiders and Scoters take several years to reach full adult plumage.

MOULTS OF THE SWANS AND THE GESE

The Swans and the Geese, unlike the ducks, which have two moults each year, have but one annual postnuptial moult, during which the entire plumage is renewed. As in the case of the ducks, the flight-feathers (except the tertials) are shed simultaneously and the birds are rendered flightless until these are renewed. The tail-feathers are shed at the same time as the flight-feathers.

The Swans and Geese pass through the same stages of immature dress as do the ducks. Young Geese assume their adult dress after the second summer, and young Swans take two or more years to acquire the pure white plumage of maturity.

IDENTIFICATION OF A SPECIMEN IN HAND

Most gunners fail to recognize many of the ducks which fall to their guns. Some do not care what kinds of ducks they may be, being satisfied to group all ducks that they shoot, and which are not instantly identifiable, under the name "grey duck" or "widgeon" (no fewer than 12 different ducks are commonly called by these names). Other gunners would like to be able to identify the specimens in their bag, and such as these will find this manual of use in their purpose.

Failure to be able to identify a specimen means that many rare birds, including some of the visiting species as well as strange and interesting hybrids, are taken and their identity is never suspected.

Due to the constantly changing plumage of the ducks, identification is not always obvious, particularly during the gunning season when the adult males are emerging from their summer eclipse moult, and the young birds of the year are moulting into their first winter plumage. It is, however, usually possible to determine with certainty the identity of any duck at any season of the year, and the gunner's interest in his sport is tremendously increased by being able to do so.

The writer cannot too strongly urge upon his fellow gunners to make a practice of identifying every duck that falls to their guns. Learn to call the birds by their correct names. Learn to distinguish between the sexes in any plumage. Learn to tell a young bird of the year from an adult. If identification were obvious and simple it would have no appeal, but because it is far from easy, it becomes a thrillingly interesting accomplishment.

If the rules given below, for identifying a specimen in hand, are followed carefully and intelligently, it will be possible for anyone, even the veriest amateur, to decide with reasonable certainty upon the identity of the specimen before him. With a little practice the beginner will become surprisingly proficient, and new fields of interest will be opened to the intelligent gunner by his increased knowledge of the various species.

IDENTIFICATION OF A DUCK

Put in its simplest form, the specimen which the gunner will want to identify in the autumn may be any one of:

- (a) An adult male in eclipse plumage, during its autumn moult, or in its full winter plumage.
- (b) An adult female in its full winter plumage, or emerging from its slightly modified summer plumage.
- (c) A young male of the year in its juvenile plumage, during its autumn moult, or in its first winter plumage.
- (d) A young female of the year in its juvenile plumage, during its autumn moult, or in its first winter plumage.

One should endeavor to become proficient in noting all signs of maturity, immaturity, and sex. In the section "Sex and Age Determination" which follows this section on Identification, several methods for establishing sex and age are given. The word "age" is used to differentiate between an adult bird and an immature one. Of the methods listed, the Cloacal Method is the most exact means of establishing sex and age, though the others must not be ignored as in many cases they will suffice for the purpose of quick identification. *In many instances it will greatly aid in the identification of the species if the age and sex of the specimen are determined before proceeding with the identification.*

In the identification of a specimen it is wise to proceed in an orderly manner. Two definite steps are necessary; the two simple "Keys" set out below will assist in identification by the quickest and surest route. The first key employs the structure of the hind toe; the second key is based on the wing pattern. Much time will be saved, and much floundering will be avoided by the use of these keys as suggested.

Read this section carefully. After a few experiments, the procedure of identification will become automatic.

THE FIRST STEP

The first step in identification is to place the bird in its proper subfamily. This is quickly accomplished by the "hind-toe formula" which provides a key to the subfamily.

KEY TO THE SUBFAMILY

- (1) **Hind toe without lobe** (fig. 7, page 5)
 - (a) *Legs short; feet do not extend well beyond tip of tail*
ONE OF THE RIVER AND POND DUCKS
 - (b) *Legs long; feet extend well beyond tip of tail*
ONE OF THE TREE DUCKS
- (2) **Hind toe with lobe** (fig. 9, page 6)
 - (a) *Bill broad; never cylindrical or "toothed"*
ONE OF THE DIVING DUCKS (OR A RUDDY OR MASKED DUCK)
 - (b) *Bill narrow, cylindrical, and with conspicuous "teeth"*
ONE OF THE MERGANSERS

THE SECOND STEP

When the subfamily to which the specimen belongs is known, the second step is to decide upon the species, or at least to narrow down to a few possibilities the number of species to which it may belong. This is best accomplished by examination of the spread-wing, and by the use of the Wing Key which follows.

Before proceeding further with the identification it is necessary to bear in mind the following points:

Note A. The wing of the adult male and of the adult female is always constant; it is the only feature of the plumage which does not vary in pattern during any moult. The wing of the adult bird is, therefore, a positive guide to the species. The spread wings of all the adults are illustrated on the Colour Plates.

Note B. The wing of the juveniles of both sexes in the autumn and until after the first postnuptial moult during the following summer) is somewhat different from that of the respective adults. The wings of the juveniles are not illustrated on the Colour Plates, but the manner in which they differ from those of the adults is detailed under "Description" of juvenile in the text. As a general rule, in (a) the River and Pond Ducks, the wing of the juvenile male resembles that of the adult male, and the wing of the juvenile female resembles that of the adult female; in (b) the Diving Ducks, the wings of the juveniles of both sexes resemble those of the adult female.

Note C. In the Colour Plates the adult birds are illustrated in both full winter plumage and during the autumn moult. Young birds of the year are not illustrated, but (except for the wings) the juvenile male during the autumn will correspond in plumage characters very closely to the adult male at that season; the young female will be very similar to the adult female.

Note D. It is sometimes difficult to distinguish with certainty between some of the species (especially in the case of certain females). In all instances of uncertainty consult "Specimen Identification" in the text which deals with similarities and puzzling variations.

Note E. The eiders and the mergansers are not included in the following Wing Key as the bill characteristics of these groups provide ready means of identification.

It is now in order to proceed with the identification of the species.

Measure the wing (see fig. 24) from the "bend" to the tip of the longest flight feather, and consult the Wing Key. Depending upon the measurement of the wing, the specimen will classify as group (1) "Wing small" or group (2) "Wing large."

An examination of the wing-coverts or the speculum, as the case may be, will now place the specimen in one of the further subdivisions as shown on the Wing Key.

Turn now to the Colour Plates of the species indicated by the Wing Key for final identification of the species, and compare the spread-wing of the specimen with the illustrations. (If the wing of the specimen finds no exact counterpart on the Plates, refer to *Note B* above.)

Example. If the specimen being examined has the hind-toe with lobe, and the bill broad, it will be seen from the "Key to the Subfamily" that it belongs to the subfamily of Diving Ducks (or is a Ruddy Duck). If it has the bent wing over 7 inches, and has white in the speculum, but no white on the wing-coverts, it will be seen from the Wing Key that it is either a White-winged Scoter, a Greater Scaup or a Lesser Scaup. Consult colour plates of these species for final identification.

WING KEY

(Note. The word "coverts," as used in this Wing Key, means "lesser" and "middle coverts" only.)

RIVER AND POND DUCKS

(1) Wing small; bent wing less than 7½ inches

(a) Coverts blue

BLUE-WINGED TEAL (Plates Nos. 13 and 14)

CINNAMON TEAL (Plates Nos. 13 and 14)

(b) Coverts not blue

GREEN-WINGED TEAL (Plates No. 12 and 14)

EUROPEAN TEAL (Plate No. 12)

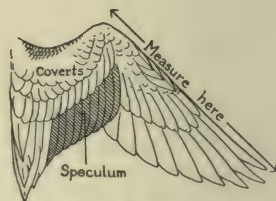


FIG. 24.—Wing Key

(2) Wing large; bent wing more than 8½ inches

(a) Speculum with much white

GADWALL (Plates Nos. 10 and 11)

(b) Coverts blue (or partly blue)

SHOVELLER (Plates Nos. 15 and 17)

(The bill is always the most distinctive character)

(c) Coverts white

BALDPATE, adult male (Plates Nos. 9 and 11)

EUROPEAN WIDGEON, adult male (Plate No. 9)

(d) Coverts dark brown

BLACK DUCK (Plate No. 7)

FLORIDA DUCK (Plate No. 8)

MOTTLED DUCK (Plate No. 8)

(e) Coverts brownish grey or grey

MALLARD (Plate No. 6)

NEW MEXICAN DUCK (Plate No. 8)

PINTAIL (Plates Nos. 10 and 11)

BALDPATE, adult female and juveniles (Plate No. 9)

EUROPEAN WIDGEON, adult female and juveniles (Plate No. 9)

(f) Coverts (entire wing) with much iridescence

WOOD DUCK (Plates Nos. 14 and 15)

DIVING DUCKS

(1) Wing small; bent wing less than 7 inches

BUFFLE-HEAD (Plates Nos. 18 and 21)

RUDDY DUCK (Plate No. 30)

MASKED DUCK (Plate No. 31)

(2) Wing large; bent wing always over 7 inches

(a) *Speculum* (entire wing) Solid brown or black

AMERICAN SCOTER (Plates Nos. 26 and 27)

SURF SCOTER (Plate No. 27)

OLD-SQUAW (Plate No. 22)

HARLEQUIN DUCK, female and juvenile (Plates Nos. 23 and 21)

(b) *Speculum* grey

REDHEAD (Plates Nos. 16 and 17)

RING-NECKED DUCK (Plates Nos. 18 and 21)

CANVAS-BACK (Plates Nos. 16 and 17)

(c) *Speculum* white, and some white on coverts

AMERICAN GOLDEN-EYE (Plates Nos. 20 and 21)

BARROW'S GOLDEN-EYE (Plates Nos. 20 and 21)

(d) *Speculum* white, but no white on coverts

WHITE-WINGED SCOTER (Plates Nos. 26 and 27)

GREATER SCAUP (Plates Nos. 19 and 17)

LESSER SCAUP (Plates Nos. 19 and 17)

(e) *Speculum* Metallic blue

HARLEQUIN DUCK, male (Plates Nos. 23 and 21)

IDENTIFICATION OF A GOOSE

The identification of a goose is much more simple than that of a duck, since geese are not subject to the same seasonal plumage variations as are ducks. Adults are readily sexed and distinguished from juveniles by one or more of the several methods described under "Sex and Age Determination," which follows this section on Identification.

In adult plumage, the sexes are alike. The appearance of each species is usually quite different from that of the other species.

The pattern of the head and neck is a feature by which an adult goose is easily recognized, and provides a simple key to the species. See fig. 25.

Having decided, with the aid of the Head and Neck Key, the species to which the specimen probably belongs, turn to the Colour Plates for final identification.

(The juveniles not illustrated on the Colour Plates closely resemble their respective adults.)



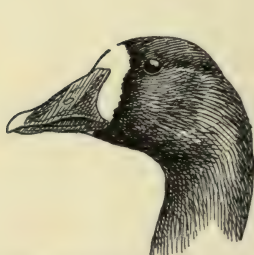
AMERICAN BRANT
(Collar incomplete in front
and behind)



CANADA GOOSE



BLACK BRANT
(Collar incomplete
behind only)



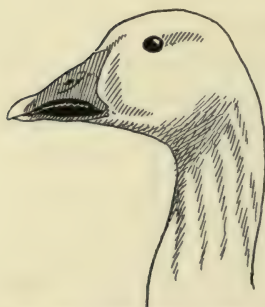
WHITE-FRONTED AND TULE GOOSE



BARNACLE GOOSE



EMPEROR GOOSE



GREATER AND LESSER SNOW GOOSE



ROSS'S GOOSE



BLUE GOOSE

FIG. 25.—Head and neck pattern of the geese

SEX AND AGE DETERMINATION

NINE METHODS

(1) AGE DETERMINATION BY THE TAIL-FEATHER METHOD

In the autumn it is often possible, by this method, to decide whether a specimen of the Ducks, Geese, and Swans is a juvenile of the year or an adult bird. Proceed as follows:

(a) If the tip of the tail-feather is normally rounded or pointed—the specimen is an adult bird (fig. 26 c).

(b) If the tip of the tail-feather is V-notched or square-ended—the specimen is a juvenile (fig. 26 b).

The reason for this difference in the tail-feathers of the adult and immature bird is that the down which precedes the juvenile tail-feathers is attached to the ends of their shafts (fig. 26 a), and when the shaft of the down breaks off, that of the tail-feather shows a resulting blunt tip (fig. 26 b). In succeeding moults, the tail-feathers are replaced with others of their own kind, and the tips of the adult tail-feathers are, therefore, normal (fig. 26 c).

The use of the tail-feather character as a means of determining age is limited to the time before the juvenile tail has been moulted and replaced by the tail of the first winter plumage. This period varies greatly even with individuals of the same species; early-hatched birds will complete the moult of the tail sooner than late-hatched birds. Until the time when the young birds lose the juvenile tail, *all* juveniles may be distinguished from *all* adults by the tail character.

Examine the tail-feathers carefully. If all, some, or even one of the tail-feathers are notched the bird is a juvenile. If none is notched the bird may still be a juvenile which has completed the tail moult, or it may be an adult.

Early dates of completion of the tail moult: The exact date of the *earliest* tail moult in the various species is not known. In the Pintail and Wood Duck, all juveniles probably wear the juvenile tail until late in August; all Mallards and Black Ducks until the first week in September. In all of the other species of the River and Pond Ducks, and in all Canvas-backs, Redheads, Ringnecks, and Greater and Lesser Scaups the juvenile tail is always worn until mid-September. In all of the other Diving Ducks the first of October is probably the earliest date for the completion of the tail moult. In geese and swans the juvenile tail is not replaced by adult feathers until late autumn or early winter.

The foregoing are the *earliest* dates for the moult of the juvenile tail; many individuals of all species, however, do not complete the tail moult until late in the autumn and in many cases some juvenile tail-feathers persist well into the winter.

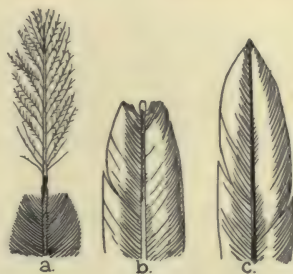


FIG. 26

(2) AGE DETERMINATION BY THE "BURSA OF FABRICIUS"

Immature birds of the Ducks, Geese, and Swans can be distinguished from adults by the bursa character. They cannot, however, be sexed by this means as the bursa is alike in the juveniles of both sexes.

The bursa is a sac-like organ (fig. 27) which empties into the dorsal (or top) wall of the cloaca; it lies on the upper side of the large intestine between the intestine and the spine. The opening of the bursa may be seen caudal (behind or tail-ward) to the opening of the large intestine, though the bursa itself is visible only on dissection.

The bursa is present only in immature birds; it is always absent in adults. It attains its highest development when the young bird is from two to four months old. It then gradually becomes smaller until, when the young bird attains maturity, it disappears entirely.

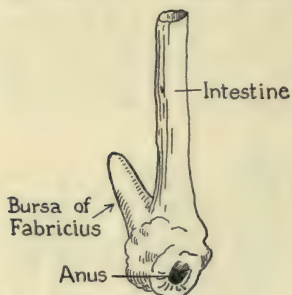


FIG. 27

In young birds the bursa is *always* present up to the end of December; some individuals of all species retain the bursa as late as April or May. In most species of ducks the bursa disappears before the young bird is one year old. (This group includes all of the River and Pond Ducks and the Canvas-back, Redhead, Ring-necked Duck, Scaups, and Ruddy Duck.)

After the end of December, as the bursa may have disappeared, this character cannot be relied upon to distinguish immature birds from adults.

In Swans and Geese (and probably in those ducks that do not breed in their first year, such as the Golden-eyes, Buffle-head, Old-squaw, Harlequin Ducks, Scoters, and Eiders) the burso does not disappear in some individuals until they are more than a year old.

The bursa was first described by Fabricius in 1621. Its function is not fully understood.

METHOD OF EXAMINATION OF THE BURSA

It is not necessary to dissect the specimen to examine the bursa. The opening of the bursa of the juvenile bird is clearly seen upon examination of the cloaca, as described under Cloacal Method which follows. See fig. 29.

(3) AGE DETERMINATION BY STRIAE OF BILL

Young ducks, geese, and probably swans, show striae (fine, narrow stripes or streaks) on the tip of the nails of the upper and lower mandibles (fig. 28). These striae are generally absent in adults. If not clearly visible with the naked eye, they can readily be seen with a low-powered glass.

Because these striae are often indistinct in juveniles, and are sometimes retained in adults, this is not entirely reliable as an age criterion.



FIG. 28

(4) AGE DETERMINATION BY FOOT COLOUR

In species which have bright-coloured feet (Mallard, Black Duck, Shoveller, and to a lesser extent the Wood Duck, Blue-winged Teal and Gadwall) the foot colour of the adult male is usually brighter and more intense than the foot colour of the juvenile male in autumn. There is considerable variation, however, and this is not reliable as an age criterion.

In females, the foot colour of the adult and the juvenile shows little contrast, and foot colour is not a character of age in the female. (Note: The "foot" includes the tarsus, and is popularly referred to as the "leg." See Glossary.)

(5) SEX AND AGE DETERMINATION BY THE CLOACAL METHOD

Both the sex and the age of a specimen can be determined by an examination of the cloaca or anal chamber.

SEX DETERMINATION

The sex of the specimen is instantly identified by the presence or absence of the penis character, which is, of course, present only in the male.

AGE DETERMINATION**THE MALE PENIS AS AN AGE CHARACTER**

The age of the male is told by the degree of development of the penis.

The penis of the male shows two stages of development: (a) In *immature birds* it is merely a small, unsheathed, fleshy appendage attached to the forewall of the cloaca just within the cloacal lip, in appearance like a tiny pigtail. (b) In *adult birds* the penis is a large white or greyish, corkscrew-like organ, which is held in a conspicuous sheath, an outgrowth of the left cloacal wall. The differences between the penis of the adult and the juvenile may be seen at a glance. See fig. 29.

In considering the penis as an age character it is necessary to class the birds in two groups:

Group 1.—Species in which the adult penis is always assumed during their first winter or spring, and in which the juvenile penis never persists in yearling birds. This group is known to include the Mallard, Black Duck, Gadwall, Baldpate, Green-winged and Blue-winged Teals, Pintail, Shoveller, Wood Duck, Canvas-back, Redhead, Ring-necked Duck, Lesser Scaup and Ruddy Duck; and probably includes the Mottled and Florida Ducks, European Widgeon, European and Cinnamon Teals and Greater Scaup. In all of these species the adult penis is never assumed before the end of December. In some young males of all species the juvenile penis persists until April or May, but after the

end of December the penis is not a reliable criterion of age in all individuals of a species. (The exceptions to this rule are the Mallard, Black Duck, Pintail and Wood Duck in which the adult penis is assumed by a few young males by the middle of November. The opening of the bursa would then have to be relied upon as the age character.)

Group 2.—Species in which the juvenile penis persists in some or all young males during their second autumn, and in which, therefore, the presence of the juvenile penis, while indicating immaturity, does not necessarily prove the specimen to be a young bird-of-the-year. This group includes all the Geese and Swans, and probably all Ducks of the following species: American and Barrow's Golden-eye, Buffle-head, Oldsquaw, Harlequin Duck, all Scoters and Eiders.

The method of examination of the cloaca to disclose the penis character is given on the following pages.

THE FEMALE OVIDUCT AS AN AGE CHARACTER

The age of the female is told by the presence or absence of the opening of the oviduct.

The functional left oviduct of the female shows two stages of development: (a) In *adult females* the opening of the oviduct shows as a conspicuous slit on the left cloacal wall about midway between the lip of the cloaca and the opening of the large intestine (fig. 29). (b) In *juvenile females* the opening of the oviduct is blocked by membrane and the left wall of the cloaca is unbroken. In those species which attain maturity in their first year the oviduct membrane disappears before they are one year old. Perforation of the membrane probably occurs as a normal function of development towards breeding age.

In considering the oviduct as an age character it is necessary to class the birds in two groups:

Group 1.—Includes species in which the oviduct membrane of the juvenile female is known to disappear before the bird is one year old. These are Mallard, Black Duck, Baldpate, Green-winged and Blue-winged Teals, Shoveller, Pintail, Wood Duck, Canvas-back, Redhead and Lesser Scaup, and probably the Mottled and Florida Ducks, European Widgeon, European and Cinnamon Teals, Greater Scaup, and Ruddy Duck. In these species the oviduct membrane has never been known to disappear before the end of December. During the summer, autumn and early winter, all these females therefore may be classed as juveniles or adults by the presence or absence of the occluding membrane.

Group 2.—Includes all of the Geese and Swans, and probably all Ducks which do not attain maturity in their first year, namely, the American and Barrow's Golden-eye Buffle-head, Oldsquaw, Harlequin, Ducks, all Scoters and Eiders. In these species the oviduct membrane is present in some or all young females during their second autumn. Hence, while the oviduct membrane is an evidence of immaturity it does not necessarily prove the specimen to be a bird-of-the-year.

METHOD OF EXAMINATION OF THE CLOACA

It is not necessary to dissect the specimen to examine the cloaca. The bird is held belly up, with the tail away, and the vent is relaxed with the fingers to expose the cloacal chamber. (If the vent has dried, it may have to be opened with a probe.)

THE MALE PENIS.

If the specimen is a *male*, the short penis of the juvenile (described above) or the large sheathed penis of the adult (described above) will protrude. See fig. 29. If there is no immediate protrusion of the penis, the forewall of the cloaca must be brought into view, for the juvenile penis may be held in the folds of the cloaca, and the bird mistaken for a female. A skilled hand will bring about the protrusion of the penis in a few seconds.

THE FEMALE OVIDUCT.

The specimen is a *female* if the penis character is lacking. It is an *adult female* if the opening of the oviduct shows as a conspicuous slit on the left cloacal wall. See fig. 29. It is a *juvenile female* if the left cloacal wall is unbroken due to a membranous covering over the opening of the oviduct.

THE JUVENILE BURSA.

If the bird is a *juvenile of either sex*, the opening of the bursa will be seen towards the tail from the opening of the large intestine; the bursa opening will be large and clearly visible. See fig. 29. The depth of the bursa may be felt by the insertion of a probe, such as a quill feather. If the bird is an *adult* the opening of the bursa will be absent, though in some yearling birds a small blind opening or a scar will be found.

The bursa furnishes corroboratory evidence of the age of a female specimen. It is not of such value in deciding the age of male birds as the penis character is usually sufficient.

The method of examination of the cloaca, given above, applies only to dead birds. Hochbaum (1942) deals fully with sex and age identification by cloacal examination, and describes in detail the technique of the examination of both living and dead birds. (Mr. Hochbaum's assistance in the preparation of this section is gratefully acknowledged by the author.)

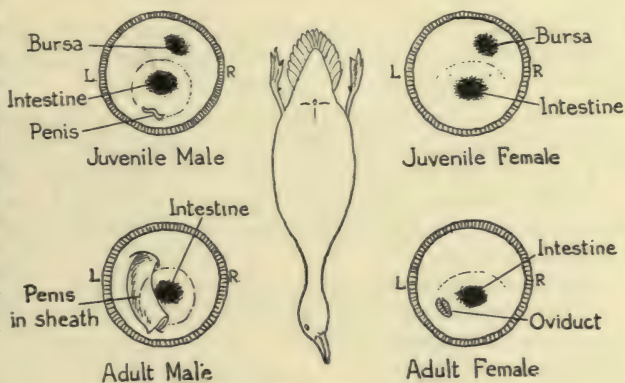


FIG. 29

(6) SEX DETERMINATION BY THE GONADS

(The Testes and Ovary)

By dissection it is possible to examine the primary organs of reproduction—the testes of the male and the ovary of the female—which are located within the abdominal cavity.

The specimen is laid on its back with the head forward. An opening is made from the tip of the breast bone to the vent or under the lower ribs on the left side. (This will not spoil the bird for table use.)

The intestines are pushed aside, care being taken not to disturb the organs and tissues fixed to the “small of the back,” particularly the kidneys.

In the case of the *male* the testes will be found, close together, one on the forward end of each kidney (fig. 30). In *juvenile males* the testes are small, elongate and kidney-coloured. In *adult males* near the breeding season the testes are greatly enlarged, somewhat translucent, and creamy white in colour; they shrink in size and become darker in colour after the breeding season. Caution: Do not mistake for the testes, a pair of small, flat, usually yellowish bodies capping the kidney; these are the adrenal glands.

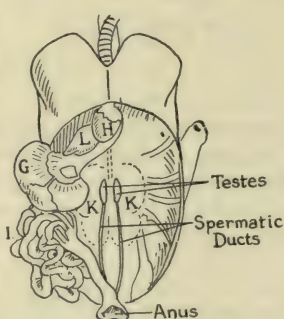


FIG. 30.—Testes and ducts of male

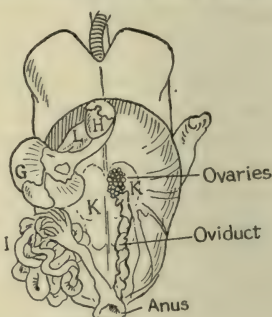


FIG. 31.—Ovary and oviduct of female

(G)—Gizzard; (H)—Heart; (I) Intestine;
(K)—Kidneys; (L)—Liver

In the case of the *female* the ovary will be found on the forward end of the bird's left kidney. (In most birds the right ovary is permanently atrophied and non-functional.) The ovary has the appearance of a cluster of small spheres like a bunch of grapes (fig. 31). In *adult females* near the breeding season these are much enlarged, and the oviduct or tube down which the egg passes toward the vent is large, wavy in outline, and whitish in colour. After the breeding season, the ovary gradually atrophies and the oviduct becomes small and difficult to trace. In *juvenile females* the ovary is small, flattish and discoloured, but is identifiable by its granular appearance.

(The shell-less egg develops in the ovary glands and passes into the oviduct, the shell being manufactured in the oviduct as the egg passes through it.)

(7) SEX DETERMINATION BY WINDPIPE OR TRACHEA

(Not applicable to Geese or Swans)

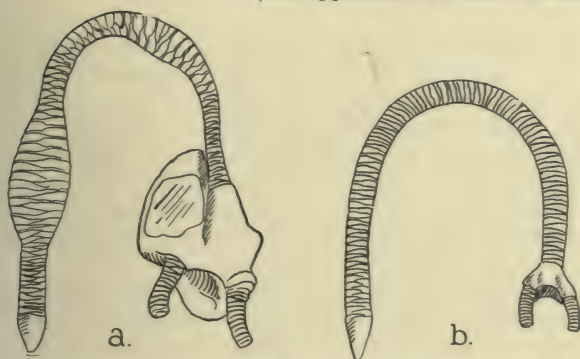


FIG. 32.—The trachea. (a) Windpipe of male;
(b) Windpipe of female

The lower end of the windpipe of all male Ducks is enlarged to form a voice-box (fig. 32). This enlargement is lacking in the windpipe of the females. In the case of the Shoveller drake the voice-box is small and undeveloped. As a rule there is also a swelling in the upper end of the male windpipe, less noticeable in the case of juvenile

males; the exceptions to this rule are the Ruddy Duck and the Scoters.

(8) SEX DETERMINATION BY VERMICULATIONS

(Not applicable to Geese or Swans)

Vermiculations, or fine wavy barring on the feathers of certain areas of the plumage are, with three exceptions, found only on the males of the Ducks. The exceptions are the female Canvas-back and the females of Greater and Lesser Scaups, which show definite vermiculations on the back and scapulars. (Some female Redheads also show vague flecking, approaching vermiculations, on the scapulars.)

When the adult and juvenile males are in the autumn moult, any vermiculated feathers appearing on such parts of the body as is usual in the full plumage indicate that the bird is a male.

Among the River and Pond Ducks those that show vermiculations are Mallard, Baldpate, European, Widgeon, Pintail, Gadwall, Green-winged and European Teals, Shoveller, Wood Duck. The Blue-winged and Cinnamon Teals show slight vermiculations in the belly region. (Those without vermiculations are the Black, Florida, Mottled and New Mexican Ducks.)

Among the Diving Ducks and Mergansers, those that show vermiculations are Canvas-back, Redhead, Ring-necked Duck, Greater and Lesser Scaups, American, Red-breasted and Hooded Mergansers. (Those without vermiculations are the Golden-eyes, Buffle-head, Old-squaw, Harlequin, the Scoters, and the Eiders.)

(9) SEX DETERMINATION BY BILL MARKINGS

(Applicable only to the River and Pond Ducks)

Females of most River and Pond Ducks show dusky markings and dark spots on the upper mandible, which markings are lacking in the males. This method of sex determination is applicable to the females of all River and Pond Ducks except the Pintail, Baldpate, European Widgeon, and Wood Duck. (Some female Pintails have well-defined spots on the bill in late summer and early autumn; these must not be confused with the marking on the bill of the male.)

MATING AND NESTING HABITS**MATING HABITS**

Swans and Geese are presumed to mate for life. In some cases, if either partner is killed, the survivor is believed never to pair again. Ducks, on the other hand, probably seek new mates each season.

In the case of those species that mate each year, courtship takes place in late winter and during the spring. There is much competition among males for the possession of a mate, and the courtship displays consist of many interesting and curious antics. In some species, mating takes place before migration to their summer range, and in others mating is deferred until the journey is accomplished.

Upon arrival on their breeding grounds the birds lose little time in starting the search for a suitable nesting site and in building their nests. Eggs are usually deposited on consecutive days until the clutch is complete. Incubation, on the average, takes about 28 days in the case of the Ducks, and somewhat longer with the Swans and Geese. Should the eggs be destroyed before the set is complete, it is usual that another set will be laid. Only one brood of young is raised each season, except perhaps occasionally in the case of the Ruddy Duck. The young birds are fully grown and strong on the wing before time for the autumn migration arrives.

The males of the Swans and Geese, while not assisting in the process of incubation, remain close by and invariably assist in the care of the young. In the case of most Ducks, as soon as incubation is well started the males withdraw into flocks by themselves and proceed to moult into the eclipse plumage, taking no part in family cares.

The male Ruddy Duck and the male Red-breasted Merganser usually assist in rearing the young, as does occasionally the male Cinnamon Teal.

The Swans do not, as a rule, breed before their fourth year; Geese usually breed in their third year. All River and Pond Ducks breed before they are a year old. Most Diving Ducks likewise breed in the spring following their hatching, the exceptions being Golden-eyes, Buffle-head, Old-squaw, and Harlequins, which do not breed until two years old. The Eiders and Scoters do not breed until their second or third year.

NESTING HABITS

The Swans always nest on the ground, building bulky structures in close proximity to water.

The Geese generally nest on the ground, but occasionally some species will occupy the disused nests of hawks or other large birds situated in the forks of trees. The Barnacle Goose nests in hilly regions and the nests are usually placed on faces of inaccessible cliffs and precipices.

The River and Pond Ducks usually nest on the ground, with the exception of the Wood Duck, which invariably nests in hollow trees or stumps. Occasionally Mallards and Black Ducks will occupy abandoned hawks' nests situated in tree crotches, and at times even use unoccupied

barns or similar buildings.

The Diving Ducks are also ground nesters, with the exception of the American and Barrow's Golden-eyes and the Buffle-head, which are habitual tree nesting species. The Western Harlequin occasionally nests in trees and on cliffs.

The American Merganser prefers tree-sites for its nest, but where such sites are not readily available it will nest on the ground. The Red-breasted Merganser always nests on the ground, while the little Hooded Merganser will always select a hollow tree or stump for its abode.

The Ruddy Duck group are ground nesters.

The Black-bellied Tree Duck nests in hollow trees, in the forks of trees, and sometimes on the ground. The Fulvous Tree Duck seems to prefer sites on the ground, though it also has been found nesting in trees.

In the Family as a whole, the habitual tree nesters are: Wood Duck, American Golden-eye, Barrow's Golden-eye, Buffle-head, Hooded Merganser, and Black-bellied Tree Duck.

FEEDING HABITS

SWANS do not dive for their food nor do they graze on land, but obtain their sustenance by "tipping" up in the shallow places, tails in the air, reaching down to the bottom to the full extent of their long necks. Their food is principally vegetable.

GEESE likewise feed in shallow places by "tipping," but most species obtain their food mainly by grazing on land, in the fields of stubble and of sprouting grain, and in pastures. Their food is chiefly vegetable.

RIVER AND POND DUCKS, or SURFACE-FEEDING DUCKS, feed, as their name implies, either at the surface, where they skim the water at the edges of the shores and banks, or by "tipping," tail up, in the shallow places, reaching down to obtain their sustenance from the bottom. Many of the ducks of this subfamily graze on land as do the Geese, and some wander deep into the woods in search of nuts, berries, and land insects. All of the ducks of this subfamily are predominantly vegetable feeders.

DIVING DUCKS usually dive for their food and feed submerged. The depths to which they dive are generally between 2 and 10 feet, though some typical sea ducks feed at much greater depths. Members of this subfamily seldom seek their sustenance on land. The Diving Ducks may be divided by their feeding habits into two groups, (a) the inland divers, and (b) the sea ducks. The feeding habits of these two groups are as follows:

"Inland divers," which include the Canvas-back, Redhead, Ring-neck, Greater and Lesser Scaups, and the Ruddy and Hasked Ducks, are (with the exception of the Greater Scaup) predominantly vegetable feeders, and their favourite foods are pondweeds, muskgrass, sedges, wild rice and other grasses, and wild celery.

"Sea ducks" include the two species of Golden-eye, the Buffle-

head, Old-squaw, Harlequins, six Eiders, and the three Scoters, all of which are preponderantly animal feeders; molluscs, crustaceans and insects form the bulk of their food. Of all the Diving Ducks, the Old-squaw is the one which partakes most of fish; even so fish form only about 10 per cent of its diet.

MERGANSERS are fish-eating ducks, and obtain their food by pursuing the smaller members of the finny tribe beneath the surface of the water.

ALL DUCKS, GEESE, AND SWANS require a certain amount of gravel which aids the gizzard in grinding the food consumed. This substance forms an important part by volume of the total stomach content, and varies in amount from 5 to 50 per cent of the total bulk.

The feeding habits of each of these birds, the food taken, and the percentage that each item of food represents in the average diet, are given in the Life Stories of the various forms.

LONGEVITY RECORDS

The following list of ages attained by individuals of the Ducks, Geese, and Swans was compiled from various sources. As would seem natural, the highest records are those of captive birds. Generally speaking, it would appear that ripe old ages for birds of this family are: ducks 20 years, geese 30 years, swans 40 years. There seem to be no records, however, of birds attaining these ages in the wild state, owing no doubt to the attention they receive from the gunner, to depredations from numerous natural predators, and to the fact that banding records do not extend over a sufficiently lengthy period.

In a letter to the author, dated January, 1941, Manley Miner says, "It is not uncommon for a duck to carry a band 10 years before being shot . . . Jack Miner has some Canvas-backs and some Swans on his sanctuary that went over Niagara Falls in 1922 and were crippled and sent to him. He gave them first aid treatment and today they are well and active on the sanctuary. How old these birds were when they went over the Falls no one knows, but all we know is we have had them in our possession 19 years."

Of the ages attained by Mute Swans, Dresser (1880) says that a common age seems to be about 30 years. It is said that these birds have been known to live from 50 to 100 years.

AGE RECORDS (in years). Whistling Swan, 8, 9, 19. Trumpeter Swan, 12, 32½. Canada Goose, 6, 8, 9, 15, 25, 29, 33. White-fronted Goose, 6, 11½. Blue Goose, 5, 10½. Common Mallard, 7, 9, 10, 11, 12½, 14, 15, 15½, 20. Black Duck, 7, 10. Gadwall, 5½, 6½, 7½, 16. European Widgeon, 4½, 20. European Pochard—reared a brood annually for 20 years. Baldpate, 6½, 7½, 8 1/3, 8½, 9 1/3. American Pintail, 10, 11, 12, 12½, 17. Green-winged Teal, 7, 8. Blue-winged Teal, 4. Cinnamon Teal, 4½. Shoveller, 4½, 5½. Wood Duck 4½, 5, 7½, 8. Redhead, 10, 11, 12, 14, 16½. Ring-necked Duck, 10. Canvas-back, 10½, 19. Greater Scaup, 5½, 6½, 7, 8, 10, 11½. Lesser Scaup, 10. American Eider, 5.

SPEED OF FLIGHT

"There is a wide-spread misconception concerning the speed at which birds normally fly, and even regarding the speed they can attain when occasion demands, as when closely pursued by an enemy. It is not unusual to hear accounts of birds flying 'a mile a minute.' While undoubtedly some birds can and do attain a speed even greater than this, such cases are exceptional, and it is safe to say that even when pressed, few can develop an air speed of 60 miles an hour. They do, however, have two speeds, one being the normal rate for every-day purposes and also for migration, and an accelerated speed for escape or pursuit; this in some cases may be nearly double the normal rate of movement. Nevertheless, the effort required for the high speeds could not be long sustained, certainly not for the long-distance migratory journeys that are regularly made by most birds.

"Sportsmen also often greatly overestimate the speed at which ducks and geese fly and sometimes attempt to substantiate their estimates by mathematical calculations, based upon the known velocity of a charge of shot, the estimated distance, and the estimated 'lead' that was necessary to hit the bird. If all three elements of the equation were known with certainty, the speed of the birds could be determined with a fair degree of accuracy. The majority of the ducks that are reported as killed at 40, 50, or even 60 yards, however, actually are shot at distances much less than estimated. To sight along a gun barrel and estimate correctly the distance of a moving object against the sky is so nearly impossible for the average gunner as to make such calculations of little value.

"During the past few years reliable data on the speed of birds have accumulated slowly. It has been found that the common flying speed of ducks and geese is between 40 and 50 miles an hour, and that it is much less among smaller birds. Aviators have claimed that at 65 miles an hour they can overtake the fastest ducks, though cases are on record of ducks passing airplanes that were making 55 miles an hour" (Lincoln, 1935).

"In the last quarter of a century the effort to ascertain the facts on the speed of avian flight has resulted in the publication of many scattered notes and some extensive papers. Stop watches and theodolites have been used to time birds flying across measured distances, and the automobile speedometer and the air-speed indicator of the airplane have furnished many reliable records. These data are demonstrating that the earlier estimates of bird speed were too high and that some birds, especially the song and insectivorous species, are rather slow flyers.

"Most persons are less interested in air speed than in ground speed. Air speed is the rate at which a bird moves through the air by its own effort, no allowance being made for the influence of the wind. Ground speed is the velocity of the actual progress of the bird between two points, or the air speed accelerated or retarded by the influence of the wind and

other atmospheric conditions. Undoubtedly, the airspeeds of different birds are much more comparable than ground speeds, since variables other than the flying ability of the individuals are reduced to a minimum. Air speeds are difficult to obtain, however, since the only means is by the air-speed indicator of airplanes The ground speed, however, can be measured more readily, though it is subject to much variation, and the conditions under which observations are made vary so greatly that two records, even for the same species, are seldom entirely comparable.

"The size and shape of the wings in comparison with the weight of a bird are important factors in determining its speed of flight. The smaller the wings in proportion to the weight, the greater will be the speed required for the bird to maintain its position in the air. More rapid wingbeats against the supporting atmosphere are necessary for a bird with a small wing surface than for one with a wing surface great enough for it to take full advantage of ascending air currents Although the weights of the Mallard and Canvas-back are nearly the same, the wing surface of the slow-flying Mallard is about 20 per cent greater than that of the swifter Canvas-back, the latter making up for this smallness of supporting surface by the rapidity of its wingbeats, aided probably also by a reduction of air resistance because of its more streamlined build. It is generally conceded that when two birds of a similar type are once in the air, the heavier bird is the faster. The quicker rise and get-away of the smaller bird, the Teal, for example, gives a false impression of speed. Radclyffe, an experienced falconer, in England, related that he had often flown a peregrine over mixed flocks of Teals and Mallards and flushed the birds simultaneously. In every case, the first bird overhauled by the hawk was a Teal; and in case of a long flight, when every bird was flying for its life, the farther the birds went, the more the Teal lagged behind. Munson reported that while chasing ducks with an airplane, he twice saw bunches of Green-winged Teals that were easily outflown by Canvas-backs in the same flock.

"It is popularly supposed that birds in migration climb until they find a favoring wind, sometimes to great altitudes. Aviators report that it is exceptional to see any birds more than 5,000 feet above the earth and that few are seen above 3,000 feet. There are, however, records of birds seen at very high altitudes above sea level, but these are mostly in mountainous country where the birds are flying at comparatively short distances above the land. The evidence thus far obtained indicates that the greater part of migration takes place below 3,000 feet above the earth's surface, much of it below 1,000 feet, and that birds prefer to fly below the level of the clouds" (Cooke, 1937).

The same writer lists some of the recorded speeds of Swans, Geese, and Ducks as follows:

Whistling Swan, 50-55 m.p.h. air speed, top speed.

Canada Goose, 60 m.p.h. air speed, chased.

Canada Goose, 44.3 m.p.h. ground speed, by theodolite.

Cackling Goose,	45-48 m.p.h. ground speed, by automobile.
Brant,	45 m.p.h. air speed.
Snow Goose,	50 m.p.h. (approx.) air speed, chased.
Mallard,	46, 50, 55, 58, 60 m.p.h. air speeds.
Pintail,	52 m.p.h. (approx.) ground speed, train.
Pintail,	65 m.p.h. (approx.) air speed, chased.
Shoveller,	47 m.p.h. ground speed, easy flight, automobile.
Shoveller,	53 m.p.h. ground speed, easy flight, automobile.
Redhead,	42 m.p.h. ground speed, train.
Canvas-back,	72 m.p.h. (approx.) air speed, chased.
Golden-eye,	50 m.p.h. ground speed, train.

The flight speed of a bird flying directly against or directly with the wind is that of its speed due to its own exertions (its air speed) minus or plus the exact speed of the hindering or favouring wind. For example, if a bird is flying at an air speed of 40 miles per hour directly *with* a wind of 30 miles per hour, the ground speed of the bird is 70 miles per hour. If the same air speed were being made directly *into* a head wind of 30 miles per hour, the bird's ground speed would only be 10 miles per hour.

The effect on the flight speed of a bird, of side winds from varying angles to its line of flight, is dealt with in an interesting and comprehensive article by Francis H. Allen, in the *Auk* of July, 1939, to which the reader is referred.

HYBRIDISM

Ducks, Geese, and Swans, like all other birds and mammals, usually pair with others of their own kind. Occasionally, however, specimens are found which are, unquestionably, the result of interbreeding between different species, different genera, or even between different subfamilies. Among the many strange hybrids recorded are crosses between Swans and Geese, between River Ducks, Eiders, and Mergansers, and between Diving Ducks and Mergansers.

The chances for crossing in a wild state are naturally greatest between closely related species whose breeding ranges overlap, and many interesting wild hybrids are encountered. As might be expected, however, a far greater number of misalliances are reported in the mixed, semi-domesticated flocks brought together from various regions and maintained through successive breeding seasons in park lagoons or zoological gardens, or confined in cages. The British Ornithologist's Club (1929) exhibited over 125 hybrids obtained largely from such sources.

Of all members of this family the Mallard is the one which is more often involved in crossing than any of the others. On this continent, the wild Mallard crosses readily and repeatedly, not only with the closely related Black Duck and with the Pintail, Baldpate, Shoveller, Green-winged Teal, and Gadwell of the same subfamily, but even with the

Northern Eider and the Mergansers, which belong to different subfamilies. Mallards of the Old World are known to cross with many additional species. The Wood Duck has been crossed with 14 other species. A rare cross between a Hooded Merganser and an American Golden-eye is illustrated on Plate No. 36. In all, some 63 species of Ducks from different parts of the world are listed as cross-breeding in the wild state.

A feature of duck hybrids, and one by which the parentage of the cross can generally be told, is that the characters of the parents, instead of being "blended," usually show distinctly in the pattern of the mongrel bird. This is well illustrated on Plate No. 36, where some of the distinctive markings of both parents are clearly discernible on each of the hybrids. Sometimes, such striking parental characters as the white collar of the Mallard, disappear in the first generation, only to re-appear in some males of later generations.

Though hybrids of kindred species, such as the Mallard and Black Duck, are usually fertile and the sex ratio is normal, this is not the case with crosses less closely related; even in the case of Mallard-Pintail crosses the resulting hybrids are rarely fertile.

As a rule, hybrids, particularly those from distantly related species or genera, are sterile like the mule (horse-donkey cross). Even if such hybrids are not sterile, they are inclined to be shy breeders and the females generally have infantile ovaries and oviducts, lay no eggs, and refuse to mate.

The great scarcity of females and an excess of males among hybrids is another feature. Thus, in a list of 248 duck hybrids, 72 per cent are males and 28 per cent are females; from a list of duck-merganser crosses only 17 per cent are females.

The prevalence of sterility and the unbalanced sex ratio among hybrids are the factors which control the perpetuation of hybrid birds. The chances of two fertile hybrids mating with one another in the wild state are remote.

BREWER'S DUCK (mallard-gadwall cross). (See Plate 36.) This famous hybrid was described by Audubon (1843) from a specimen shot in Louisiana, in February, 1822. Audubon named it "Brewer's Duck," saying, "I have named this Duck after my friend Thomas M. Brewer of Boston, as a mark of the estimation in which I hold him as an accomplished ornithologist." When this was written the describer unquestionably thought that the specimen was a valid species, though when describing the bird (1843), he evidently had doubts on the matter for he stated that it might possibly be an accidental variety, or a hybrid between the Mallard and "some other species, perhaps the Gadwall, to which also it bears a great resemblance." The so-called "Brewer's Duck" is now recognized as a mallard-gadwall hybrid.

WESTERN DUCK SICKNESS—A FORM OF BOTULISM

In 1910, the tremendous mortality among ducks and other birds in the vicinity of Great Salt Lake, Utah, first attracted continent-wide attention, when tens of thousand of ducks were found dead in this region. The sickness continued to take its toll in succeeding years, and there has been a notable increase in the number of points of outbreak. Distribution of the disease conforms in general to the region of alkaline waters and soils of the Western States and the southern part of the Western Canadian Provinces.

The disease, though varying in intensity from year to year, is considered to be the greatest drain upon western waterfowl due to any single natural agency.

Some idea of the extent of the ravages of the disease is given by Kalmbach and Gunderson (1934) who, speaking of one district only, say: "Estimates of dead ranging from less than 100,000 to more than 300,000 made at Great Salt Lake in August, 1929, give a general idea of the severity of the epizootic in that year . . . in 1932, an estimate was made of the number of dead on the south shore of Willard Spur. Sections of the shore line 100 yards in length were taken as units and the readily visible dead counted. For a distance of 6 to 8 miles dead ducks were scattered on the flat terrain in numbers ranging from 8,000 to 10,000 to the mile. It was estimated that there were 150,000 dead on the south shore of Willard Spur and the adjacent Bear River Bay. Many more thousands lay scattered on the east, north, and west shores, and an indeterminate number were hidden in the vegetation of the Bear River Migratory Bird Refuge or obliterated on the mud flats. It was estimated that fully a quarter of a million water-fowl perished from duck sickness in this general area during 1932."

In early stages of the investigations of the disease it was thought that the sickness was due to toxic action of certain soluble salts found in alkali. It has now been established, however, that the malady is a form of botulism, caused by a bacterium, *Clostridium botulinum*, type C.

This organism thrives under conditions of decay of dead organic matter, animal or vegetable, in an alkali environment; shallow, stagnant water and hot weather are factors that greatly favour development of these conditions of decay. The disease is, in effect, a form of food poisoning. No instance of human beings contracting botulism through eating the flesh of infected birds is known.

In summarizing remedial measures which might be applied, Kalmbach and Gunderson (1934) suggest that lasting and effective means of prevention of the disease lie in modifying or eliminating the conditions that favour the development of the organism. By flooding mud flats and shallow, stagnant water areas with deep or flowing water, temperatures are reduced and, through a process of dilution, the poison may be reduced to the point of harmlessness. The expedient of temporarily cutting off all water from infected areas has also been used effectively where the

ground may be completely dried and thus become unattractive to birds in midsummer. Inadequate water supply and fluctuating water levels are the chief causes of outbreaks of duck sickness. These are often the result of the diversion of water by man where formerly nearly constant water depths were maintained throughout periods of hot weather. "Unless these conditions can be restored, duck sickness will continue to take, ever increasingly, its annual devastating toll of western wild fowl."

LEAD POISONING

All birds of the family *Anatidae* require certain quantities of gravel or grit for the necessary grinding of food in the gizzard and, in seeking this essential substance, will swallow any small, hard objects they encounter while feeding. Large quantities of lead shot are deposited every year about shooting points and blinds in shallow bays and marshes, and are taken in surprising numbers by the feeding wild fowl. Lead poisoning results, and is so deadly in its effect that it is proving to be a factor of considerable importance in the decline of our waterfowl.

As a result of investigations into the poisoning of waterfowl by lead, Wetmore (1919) says: "It was found that six pellets of No. 6 shot constituted an amount of lead that was always fatal. Two or three shot were sufficient to cause death in several instances, and as the number was increased the resistance of individual birds decreased. In one experiment two Mallards were each given one No. 6 shot. One died 9 days later, while the other was able to throw off the effects of the lead and recover. Pintails and Redheads were similarly affected. One male Pintail was given four pellets of No. 6 and another six. Both died, the former in 11, and the latter in 13 days. One Redhead was killed by taking six No. 6 shot. Another was given four pellets of shot and was sick for some time, but finally recovered."

Describing postmortems on ducks that had died of lead poisoning the same writer says: "The usual number of shot in one stomach was 15 to 40. The largest number of pellets taken from one bird was 76, found in the gizzard of a Mallard secured near the mouth of the Bear River, Utah. In September, 1916, during routine laboratory work, 28 Mallards and 10 Pintails that had died from lead poisoning were examined. From the stomachs of these 38 birds 939 shot were recovered, an average of a fraction less than 25 each." Cottam (1939) referring to Canvas-backs, says: "Lead shot pellets are sometimes picked up by these ducks as they feed. This is altogether too common an occurrence in baited areas where large numbers of shot are expelled over a limited area where the birds repeatedly feed, with the result that large numbers of birds experience a lingering death and that those that do recover probably become sterile. The writer found 96 shot (lead pellets) in a single gizzard of this species." Referring to 477 Lesser Scaup taken during a gunning season, the same writer says: ". . . it was found that 365 (more than 76.5 per cent) had consumed a total of 4,191 lead pellets—an average of 11.5 shots per bird—and that individual stomachs contained from 1 to 58 pellets."

MIGRATION ROUTES AND FLYWAYS

CONTRIBUTED BY

FREDERICK C. LINCOLN

*In Charge, Distribution and Migration of Birds,
Division of Wildlife Research, Fish and Wildlife Service,
U. S. Department of the Interior*

The terms "migration route" and "flyway" have in the past been used more or less indiscriminately, but for the purpose of this article and in order that the full picture of migration may be better portrayed, it seems desirable to designate as migration routes the individual lanes of avian travel from breeding grounds to winter quarters, and as flyways those broader areas into which certain migration routes blend or come together in a definite geographic region. The individual migration routes may be likened to long trails, while the flyways resemble arterial boulevards to which the routes are tributary. Except along the coasts, the boundaries of these flyways cannot always be sharply defined, particularly in the northern part of the interior, for the reason that—broadly speaking—all the country from Nebraska north to the Arctic coast is one great breeding ground that is used by many species of migratory waterfowl. From about latitude 45° southward to the Gulf coast, however, these flyways are fairly well marked, and it is within this region that most of the sport shooting takes place. The status of the ducks and geese in the different flyways, therefore, is of great interest not only to naturalists but also to sportsmen.

It is now a matter of common knowledge that migratory birds follow certain definite routes on their journeys to and from breeding and winter quarters, but it is not generally understood that these routes are followed by the same groups of individual birds during successive years. Migration studies by the banding method have shown that by adhering more or less rigidly to any particular flyway the ducks and geese tend to perpetuate not only that ancestral route but also the groups of individuals that use it.

THE FOUR IMPORTANT FLYWAYS

The four major waterfowl flyways of North America and their tributary migration routes are sketched in the following paragraphs.

THE ATLANTIC FLYWAY

The Atlantic flyway (fig. 32) may be described as extending from the Atlantic coast west to the Allegheny Mountains and curving northward across northern West Virginia and northeastern Ohio to the western end of Lake Erie. It has at least three primary migration routes and as many more that are also important as tributaries.

The extreme eastern route, which leads directly down the coast, has as its northern origin the eastern Arctic islands and the coast of Greenland. From these places come the Greater Snow Geese and the American Brant, which follow the coast line to winter quarters in the great bays and sounds of Virginia and North Carolina. This also is the route used by large numbers of Black Ducks and Canada Geese. These two species, however, occupy a curious part in the picture of this flyway. The Canada Geese and the Black Ducks, so important to the sportsmen of New England, come chiefly from the New England area, the Maritime Provinces of Canada, the Labrador Peninsula, and Newfoundland. Few, if any, come from interior points that are far from the seacoast, and they do not ordinarily travel very far south of Long Island Sound. A few of the northeastern Black Ducks do drift south as far as the Carolinas, but the Canada Geese rarely go south of New England.

Most of the Black Ducks of the south- and middle-Atlantic coast, and practically all the Canada Geese, come from interior points. The ducks, which seem to come chiefly from western Quebec and Ontario, leave their breeding grounds in this region and at first travel southwestward through the peninsula of southern Ontario. This also is the course taken by the Canada Geese from the breeding grounds around the eastern shores of Hudson Bay. Upon reaching the western end of Lake Erie, where it is augmented by birds bred in Michigan, the route divides, the majority of the birds turning abruptly to the east, some tarrying a while in the area along the south shore of the lake, but nearly all eventually making a cross-country flight over Pennsylvania and northern West Virginia to the Atlantic coast, which is reached in the vicinity of Chesapeake and Delaware Bays.

This route from the northwest is of great importance. In addition to being followed by the Black Ducks and Canada Geese, it also is the general course taken by the Diving Ducks and others that come from the great interior breeding grounds. No ducks of the genus *Nyroca*, ex-



FIG. 32.—The Atlantic Flyway

cept the Ring-necked Duck, breed in the eastern part of the continent, so practically every Canvas-back, Redhead, and Greater and Lesser Scaup that is seen in winter in Chesapeake Bay, Back Bay, and other middle-Atlantic coastal waters, has pursued this route. Some moderate-sized flocks do travel eastward along Lake Erie to the Finger Lakes region of western New York, and occasionally these birds are noted in New England waters, but the main body reaches the coast south of New Jersey. With them are some Pintails, Gadwalls, Teals, and other shoal-water species that also have bred in the interior.

A most interesting tributary of this northwestern route has its starting point in the Bear River Marshes of Great Salt Lake, Utah, and is apparently used exclusively by Redheads. As conclusively shown by banding records, many Redheads banded as ducklings in these marshes start their fall journey by first flying north across southeastern Idaho and northwestern Wyoming, turn eastward across Montana, the Dakotas, Minnesota, Wisconsin, and Michigan, and, joining others of their species en route out of the Prairie Provinces of Canada, continue to the Finger Lakes region of western New York, or to the coasts of Maryland and Virginia. This is probably one of the most remarkable migration routes of all North American waterfowl, and it is interesting to observe that in crossing from west to east through the Dakotas, Minnesota, and Wisconsin, many of these birds are actually flying at right angles to others of their own kind that are following routes from the north to the Mississippi or the Central flyways.

The Greater Scaup, or Big Bluebill, which in winter is sometimes present in large rafts in waters adjacent to Long Island, and the Scoters of the New England coast, also come chiefly from interior points.

Another tributary route to the Atlantic flyway is really a branch from the Mississippi flyway that apparently leaves the parent stream in the general vicinity of St. Louis, Missouri, and, striking across the mountains, reaches the coast of South Carolina. This route is followed by Blue-winged Teals, and probably by some Gadwalls, Shovellers, and possibly by some Ringnecks. The last-named species, however, is chiefly a Mississippi-flyway bird and, while in winter it is often plentiful in southern Georgia and northern Florida, it is significant that of several hundred banded in Georgia, not one has been recovered from a point on the Atlantic coast, their route of migration being through the Mississippi Valley.

It will thus be seen that the Atlantic flyway is a complicated system of migration routes.

THE MISSISSIPPI FLYWAY

In some respects the Mississippi flyway (fig. 33) is relatively simple, although it has at least one complicating feature. Its eastern boundary runs through southern Ontario to western Lake Erie, thence across Ohio and Indiana to the Mississippi Valley, where it closely follows the river to its mouth. This line is clearly defined. The western boundary, however, does not permit such precise definition, for the reason that in

eastern Nebraska and western Missouri and Arkansas, it merges imperceptibly into the Central flyway. Nevertheless, a boundary line may be drawn with reasonable accuracy from southern Saskatchewan, across northeastern Montana, thence southeastward along the Missouri River to western Missouri and across western Arkansas and northwestern Louisiana to southeastern Texas.

Easily the most important migration route of this flyway is the long lane of travel that starts on the Yukon Flats in Alaska, traverses the valley of the Mackenzie River, and the great lake and prairie region of central Canada, receiving

many accretions on the way, and in turn contributing to other flyways. Running generally from northwest to southeast, it enters the United States on a broad front from Montana to Wisconsin but tends to constriction as it proceeds southward, so that in central Arkansas it results in heavy concentration. This might be termed the "Mallard route," although it is used also by large numbers of Pintails and Canada Geese and by lesser numbers of several other shoal-water species. The Ring-necked Duck likewise concentrates on this route, as do some of the Lesser Scaups and a few other deep-water ducks. Coming in from their breeding grounds in western Ontario and Michigan and from Wisconsin and Minnesota, a considerable body of

Black Ducks proceeds across Illinois by way of the Illinois River. Another contingent of this species, together with a good representation of Canada Geese, comes in from the northeast. These latter birds, from breeding grounds in western Quebec and Ontario and from Michigan, leave their companions bound for the Atlantic coast in the general vicinity of western Lake Erie, and, proceeding across northwestern Ohio and through Indiana, reach the Mississippi Valley near the mouth of the Ohio River.

The features of particular significance in this flyway are the vast areas of breeding territory that are tributary to it and the greatly restricted winter quarters. These factors result in a heavy concentration



FIG. 33.—The Mississippi Flyway

during winter, and are conducive in erroneous conclusions relative to abundance and to excessive slaughter.

THE CENTRAL FLYWAY

As previously stated, the eastern boundary of the Central flyway (fig. 34) merges imperceptibly with the western boundary of the Mississippi flyway, but in general it is bounded in this direction by the Missouri River and by the western parts of Arkansas and Missouri. The

western boundary appears to start on the north at Great Salt Lake, Utah, and runs southeastward across Utah and western New Mexico.

Along this flyway sweep flocks of ducks that in the north country share a common breeding ground with others of the same species that follow in migration all the other flyways. Lying across the northern terminus of the western boundary is the most important single breeding ground for waterfowl that now remains in the United States — the Bear River Marshes at the northern end of Great Salt Lake, Utah. This is still an important breeding area for Pintails, Redheads, Cinnamon Teal, and others. A large percentage of the birds raised here follow lanes of travel west-



FIG. 34.—*The Central Flyway*

ward to the Pacific flyway, but it is noteworthy that there are at least three routes that leave this area in an easterly or northeasterly direction. One of these, tributary to the Atlantic flyway, has already been described. A second easterly route from these breeding grounds extends across southern Wyoming, turns southward across the Laramie plains and eastern Colorado, and by way of the Panhandle of Texas ends on the Gulf coast. The third route turns southward in northwestern Colorado, across the Uncompahgre Plateau, passes through the San Luis Valley, and extends southward into Mexico.

It is significant that while the Bear River Marshes are an important waterfowl concentration point, where large numbers of ducks are killed each season, it has furnished almost no recovery records of birds banded in Canada.

With the exception of the tributary routes from the Bear River Marshes, this also is a relatively simple flyway, as the majority of the ducks that use it make direct north and south journeys from breeding grounds in central Canada and other northern regions to their winter quarters, which are chiefly in Texas.

THE PACIFIC FLYWAY

The Pacific flyway (fig. 35) presents some interesting peculiarities. While the map shows a route that follows the coast of British Columbia, it should be pointed out that this is not an important lane of travel for many of our game ducks, but it is followed chiefly by the diminutive Cackling Goose, the Black Brant, and some of the sea ducks. There is, however, an offshore flight of Pintails and possibly other ducks, the origin and destination of which is at present incompletely understood. The Cackling Geese that breed in the delta region of the Yukon River in Alaska follow this route across the Alaskan Peninsula, the Gulf of Alaska and along the coast of British Columbia, turning into the interior near the mouth of the Columbia River. Proceeding eastward only a short distance they again turn south to their winter quarters at Tule Lake Wildlife Refuge, on the Oregon-California line, and in the Sacramento Valley of California. A few continue southward as far as the northern part of the San Joaquin Valley.

Most other geese, including the greatly reduced Ross's Goose, and ducks that use the United States part of this flyway, however, come from eastern Alaska, Mackenzie Valley, and other interior points. Again, the great breeding grounds of central and northwestern Canada and eastern Alaska produce most of the birds killed by California and Oregon sportsmen. Starting in Alaska, Yukon, and Mackenzie, this route—which also is used in common by many birds that are to follow other flyways—runs southward through the Prairie Provinces. The Pacific flyway contingent probably parallels closely the eastern foothills of the Rocky Mountains. The route branches



FIG. 35.—*The Pacific Flyway*

somewhere near the international border, and while some birds continue southeastward into the Central and Mississippi flyways, others turn southwestward across northwestern Montana and the Panhandle of Idaho, follow along the Snake and Columbia River Valleys, and turn southward across central Oregon to the great interior valleys of California. This is the route followed by the Pintails and the Widgeons, or Baldpates, which are of such importance to California sportsmen.

The Bear River Marshes of Utah probably furnish the majority of the Redheads that are killed for sport in California. Banding records have indicated two routes that are roughly parallel. The northernmost leaves the breeding grounds in a northwesterly direction and, describing an arc across southwestern Idaho and southeastern Oregon, enters California near the California-Nevada line. The second route runs through central Nevada and reaches the California valleys near the confluence of the Sacramento and San Joaquin Rivers.

The breeding grounds of interior British Columbia have been little affected either by agricultural or drought conditions and continue to produce a fairly good supply of waterfowl, but banding records have shown that these birds have comparatively little importance to the sportsmen of the United States other than to those of northwestern Washington. The reason apparently is found in the relatively mild climate of the Puget Sound section, which is the wintering ground for most of the British Columbia ducks. Very few birds banded in that Province have been recovered from points south of Washington.

BANDING WATERFOWL

By

FREDERICK C. LINCOLN

The marking of birds as a means for the study of their migratory movements may be traced back fully two hundred years. Nevertheless, it was not until the closing years of the nineteenth century that systematic banding received serious attention. At that time a Danish schoolmaster of Viborg, Mortensen by name, began to mark storks, teals, starlings and two or three different kinds of hawks. This work may be justifiably known as the pioneer activity in scientific bird banding.

Stimulated by the success of Mortensen's efforts, bird banding came rapidly into prominence in many European countries. By 1914, eighteen or twenty projects were in active operation.

In North America, following a few private and bird club efforts, an organization known as the American Bird Banding Association was formed in New York City on December 8, 1909. With the help of many individuals and under the guidance of the Linnaean Society of New York, this association carried on banding in both the United States and Canada until 1920, when, having outgrown available resources, the work was formally taken over by the U. S. Biological Survey of the Department of Agriculture. [On June 30, 1940, the Bureau of Biological Survey and the Bureau of Fisheries, both of which had been transferred to

the Department of the Interior on July 1, 1939, were consolidated to form the Fish and Wildlife Service.] Previous to this, Alexander Wetmore while a member of the Survey staff, making investigations of the cause of duck sickness in the Bear River marshes of Utah (1914 to 1916), banded about 1,000 ducks and other birds, using bands that carried the address of the Biological Survey (fig. 35B).

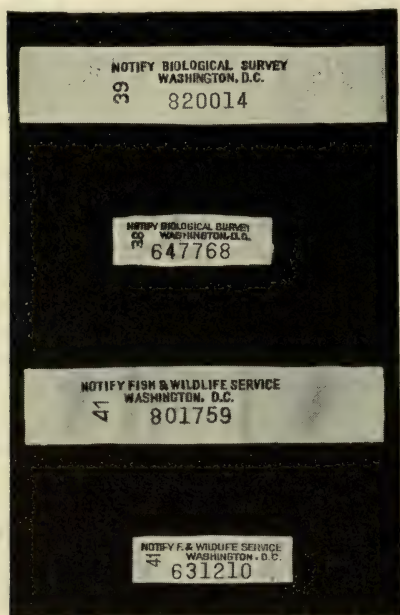
Since 1920, the banding of all North American birds has been so expanded that at this time (April 1942), the grand total thus marked is more than four million. The work is done in close cooperation with the National Parks Bureau of Canada, and copies of all records of interest to Dominion naturalists are filed in Ottawa.

In the United States the banding of ducks and geese is now confined to refuge areas, chiefly those under the supervision of the Fish and Wildlife Service. In this great system, which extends from the Atlantic to the Pacific and from the Canadian border to Mexico, certain refuge managers are specially authorized, under the provisions of the Migratory Bird Treaty Act, to trap birds for banding. In addition to the Service address, each band carries a number and a series designation, as 41-672439. Both parts of the number are important and should be always included in the report of any band recovered.

Data resulting from the banding of ducks and geese were the basis for the elucidation of the flyways referred to in waterfowl research and regulations. This information has been of great importance also in the development of the refuge system and it has

FIG. 35B.—Official bands used on North American ducks and geese. Many thousands of birds are still wearing bands stamped "Notify Biological Survey" (or an abbreviation), but most of those marked in recent years carry bands that instruct the finder to "Notify F. & Wildlife Service."

played other parts in the rehabilitation of the great waterfowl resource. Sport shooting of these birds by all citizens interested in this form of recreation is a typically American institution. Its perpetuation demands team work of the highest order between sportsmen, naturalists, and administrators. Reporting the details for every banded duck or goose that may be obtained is a part of the responsibility of every hunter who desires the continuation of this sport not only for himself but for the enjoyment also of future Americans.



CONSERVATION OF WATERFOWL

CONTRIBUTED BY

DR. IRA N. GABRIELSON

President, Wildlife Management Institute

Waterfowl have the same general requirements as do other forms of wildlife. They must have suitable environment for their year-round living activities and their perpetuation depends upon the survival of an adequate breeding stock each year. While basically the problem of conserving waterfowl is the same as that for conserving nonmigratory species, the difficulties encountered in solving it are greatly augmented by the migratory habits of ducks and geese. Many of them travel nearly the length of the continent twice each year and must find the marsh and aquatic environment they require wherever they may be at any season.

Compared with quail or grouse which remain in restricted territories the whole year, the shifting populations of waterfowl are more difficult to provide with suitable living conditions. No one community, no one State, and no one nation can handle this conservation problem alone. Canada and Alaska together produce a large proportion of the waterfowl inhabiting the North American continent. These vast countries embrace the major part of the remaining good breeding grounds for waterfowl and although we are endeavoring to restore the old nesting places in the United States, the most important wildfowl producing area must always be in these two regions. On the other hand, the United States, and, to a lesser extent, Mexico provide continental wintering grounds for the birds. These commonwealths furnish a far greater proportion of the winter resorts of waterfowl than do all other countries of the hemisphere combined. These areas, it may be pointed out, are just as important to the birds as are the breeding grounds.

It will be of little conservation value to restore the breeding grounds if there is no feed, shelter, or protection for the birds in the areas where they must spend the colder half of the year. If there is not sufficient food on the wintering grounds in the United States there will be no birds to return to the breeding zone. Neither the nesting nor the wintering part of this problem in conservation can be said to be more important than the other. Wherever there is a shortage of breeding grounds, restoration must be accomplished. If there is a deficiency in wintering accommodations, that must be remedied. One of the great uncertainties as to the future of migratory waterfowl concerns the extent to which the great marshes of the Atlantic and Gulf coasts of the United States, which furnish the principal wintering areas for three of the four great flyways of the continent, can be preserved and protected against drainage, drought, invasion by salt water, or destruction from other causes.

In considering the waterfowl conservation problem, we can divide it into three parts to correspond with three groups of the birds. We have certain species whose breeding grounds are still as productive as ever. These include all of the geese except one form of the Canada Goose popularly known as the Honker. The nesting habitat of the other forms of this species, that is, the Lesser Canada, the Hutchins' [Richardson's], and the Cackling Geese, as well as of the White-fronted, the three forms of white geese, and the Blue Goose, are still practically unimpaired and are as productive as ever. To a very large extent this condition prevails also with respect to Eider Ducks, Old-squaws, and Scoters. To insure an adequate crop of these birds it is necessary only to provide an abundance of winter food and enough protection to insure the return of sufficient brood stock to the nesting areas. No breeding ground restoration is needed.

Another great group of waterfowl, including the Mallard, Pintail, Baldpate, Scaups, Green-winged Teal, and some others, use breeding grounds extending from the shores of Bering Sea to Hudson Bay or beyond and even well down into the United States. These are among our principal game species. During the past few years there have been records of Mallards breeding as far south as Tennessee, Iowa and Missouri, also in California, Nevada and Oregon. Wherever there are marshes throughout this wide territory this species is likely to nest. Only a comparatively small part of its breeding grounds has been destroyed. There is still available to the several ducks mentioned a tremendous additional breeding grounds that the birds will use; such restoration is not as vital to the preservation of these species as it is for certain others. It is very necessary, however, to maintain and improve winter homes for these species which at present furnish the bulk of the wildfowl available for sporting purposes. Their wintering grounds are widely distributed over the United States, but their great concentrations are in the southernmost thousand miles of the Mississippi Valley, along the Atlantic coast and the Gulf of Mexico, in certain valleys of western Mexico, and along the Pacific coast of the United States.

There is a third group of waterfowl, including some of the most prized game species, whose breeding grounds have been very seriously impaired in the past thirty or forty years by drought, agricultural drainage, and other developments. This division embraces the Canvas-back, Redhead, Blue-winged and Cinnamon Teals, Gadwall and Ruddy Duck. The greater proportion of the original nesting areas of these species was in the United States and Prairie Provinces of Canada where agriculture, drainage, and drought have done their worst in destroying waterfowl environment. It was chiefly losses in these regions that forced the population of these species downward to a level much below that of the more widely ranging breeders. Restoration and maintenance of breeding areas is necessary for the increase of these species even though they have adequate wintering grounds.

We have two tools that we may use in carrying out a restoration program for our migratory waterfowl. One is the preservation of existing marshes, restoration of destroyed areas, and improvement of wintering environment for the species; and the other is adequate regulation of the kill.

We must always keep in mind that approximately a hundred million acres of land have been drained on the North American continent in the past fifty to seventy-five years. In simple language this means that we cannot build or maintain as large populations of waterfowl as formerly existed. The permanent loss of nesting places included in that hundred million acres puts a definite limit on the total to which the population can be raised. We can overcome that handicap only in so far as these drained marshes can be restored or replaced.

Both the Canadian and the United States governments have been busy in the restoration of environment. Canada has built many thousand small reservoirs to hold water in the Prairie Provinces. Many of these contribute materially to the safety and welfare of waterfowl. Provincial and private organizations have restored or developed other areas, some of them of primary importance for the more southern breeding birds. The United States government, in the course of a 12-year program, greatly accentuated in the past six, has restored or developed vast marsh and water areas for the use of migratory waterfowl throughout the country. This effort has gone steadily ahead until between three and one-half and four million acres of land either have been developed or are under development for the benefit of the birds.

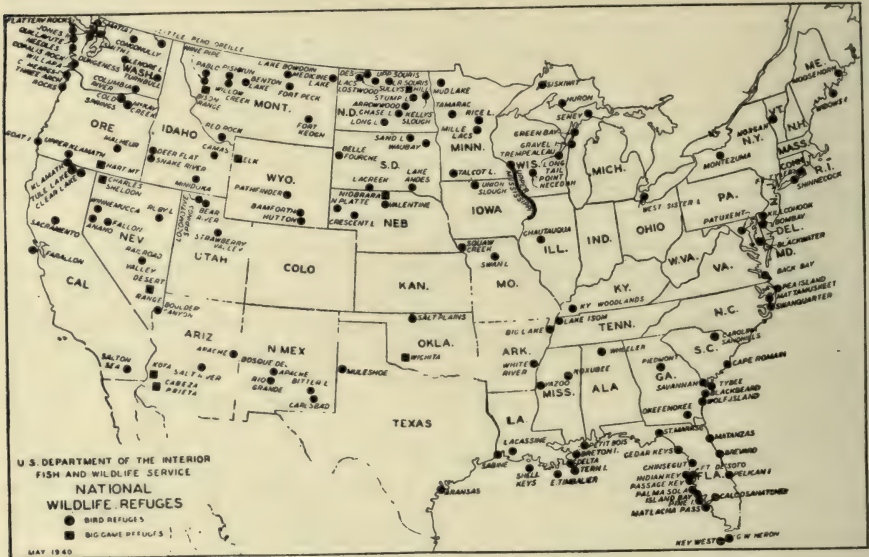
The program has included restoration of breeding grounds in the northern States, provision of nesting and feeding areas on the principal migration routes, and the improvement and restoration of winter resorts. All of these objectives are of equal importance and no continental program to insure perpetuation of the waterfowl can succeed without every one of them.

The accompanying map showing the location of the present Federal waterfowl refuges gives some idea of the extent of this conservation activity in the United States. It does not include many State refuges that have been, or are being, developed nor those maintained by cities, local organizations or individuals. The total acreage of all refuges is becoming large enough, however, to be an effective factor in the protection of the birds.

Along with refuge development an important activity of that part of the Fish and Wildlife Service that was formerly the Biological Survey, has been prevention of destruction of certain marshes. We have not always been successful, but there are millions of acres of marsh lands in existence today that would have been drained and destroyed if it had not been for this effort.

To one understanding the waterfowl situation, the map reveals that there are still great gaps in the refuge system. There is great need for additional wintering grounds, particularly in Texas and California;

there are numerous areas that should be developed along the migration routes; and there are still a few major breeding ranges that can be restored, although all of the major restorations of this type that are at present economically feasible are under way.



In addition, there are thousands of small areas in all three classes that are now being developed to a considerable extent by private and community initiative. In Canada, the Provinces and private organizations are carrying out the same kind of restoration program. Together the combined effort of all agencies is great enough that it is having a marked effect, and will continue to do so as long as the marshes are maintained and protected.

The other factor necessary to the conservation of waterfowl, that of regulating the take, has been protested by certain individuals and probably always will be. It is impossible, however, to maintain a continental population of migratory waterfowl great enough to permit everyone to kill as many as he pleases, and still have satisfactory numbers left. Some restrictions on the take and methods of taking are necessary to maintain a breeding stock to produce the next year's crop. While it is absolutely true that without marshes to provide year-round homes for them, migratory waterfowl cannot exist, it is equally true that all the marsh restoration in the world will be useless unless an adequate stock of birds is preserved to inhabit the marshes and to produce the crop that we wish to harvest.

What can the individual do to help this program? There are numerous opportunities. He can aid by supporting the program, finan-

cially and morally. In the United States it is easy for any sportsman to assist on restoration projects undertaken by local groups; he can also help the Federal program by purchasing duck stamps. By law ninety per cent of the receipts from the sale of these stamps goes into the purchase, development, and maintenance of migratory waterfowl areas. Anyone who has a dollar or more to contribute, can do so by buying extra stamps with the assurance that ninety per cent of his money will go to the marsh restoration program. He can also support private organizations that are sponsoring restoration. He can help by encouraging the development of suitable local areas. There are few places where it is not possible to develop a small marsh or pond attractive to waterfowl and which will have value in furnishing food and shelter for the birds. Many cities have in their park systems ponds or lakes that are very attractive to waterfowl because they are properly developed. Such areas have a value far beyond that of the actual number of birds they preserve because they educate the people to realize the importance of the waterfowl conservation program.

Every sportsman can aid by helping to raise the standards of sportsmanship. We who hunt ducks (and I number myself among the most enthusiastic followers of this sport in the country) have been lucky in one way. Long after much of the upland game had vanished we had remaining a tremendous supply of migratory waterfowl. We failed to use it wisely and as a consequence have had to cut down on the harvest. Now we face the necessity of building back the supply. Until recently we have not had the necessary urge and drive to do this. We still think too much about the number of birds in our bag and too many of us still feel that we should get the limit of birds each time we hunt. We believe that we are entitled to that number of birds and if we do not get them feel that something is very wrong. We still hold the view that we are not successful hunters unless we can take enough birds not only for our own use but also to give to our friends.

Until recently we have not had anything comparable to the attitude that has developed among a great many trout fishermen who deliberately give the trout all the breaks. They use lighter equipment, barbless hooks and restrict themselves voluntarily to less than the legal take except on rare occasions when they have actual use for the limit of fish. There are many hundreds of trout fishermen who keep only one or two fishes, carefully returning to the water all those not needed for their own personal use.

I know many grouse hunters who are satisfied with one or two birds per day. They enjoy matching wits with the game and they enjoy being in the woods and doing the rather strenuous hiking necessary. It has been encouraging to note the growth of a similar attitude among duck hunters. Each year there are more people who are willing to give the birds a break. There are increasing numbers of wildfowlers who have ceased to be limit worshippers and who are satisfied with one or two birds per day if that is what they need for their own table. They have

found by sad experience that much of the game they give away is wasted. Many on whom they bestow these gifts will not take the trouble to dress and prepare the game, and it eventually finds its way into the garbage.

We need to devote some time and thought to making our sport more difficult and in realizing the greatest recreational value from each bird taken. After we kill a duck we cannot return it to its native environment as we can a trout after we have had the thrill of playing, but I believe that we can develop something similar. I know many hunters who have directed their waterfowling somewhat along the lines of grouse hunting. They use no blinds; they jump shoot entirely; and match their skill against the waterfowl. These men get few birds but an enormous satisfaction out of those they do collect. I am not recommending this as a procedure for everyone to follow but I am suggesting it as a type of thing we duck hunters should think about.

With the increasing number of hunters and the limitations on the possible crop imposed by the available environment, there are not now and probably never will be enough migratory waterfowl to furnish the kind of shooting that was available to earlier generations. We now have better guns, faster transportation, and a greater average range for the hunter. All of these factors work against the waterfowl. The total area for them to live in is much smaller than it was and there is a consequent greater crowding of the birds. Formerly only a relatively small number of people took the time and trouble necessary to get to the ducking grounds with the means of travel then available. Modern transportation has changed the situation and there are thousands of gunners who now go long distances to hunt where there were only dozens a few years ago. This puts an additional drain on the migratory waterfowl and stacks the odds against them.

One of the ways by which you and I as individual duck hunters can help most in this program is to visualize these problems and try to adjust our standards of sportsmanship to meet the conditions.

A second important contribution that every duck hunter can make toward maintaining our stock of migratory waterfowl is to exert every effort to retrieve cripples. It is a poor sportsman who lets a cripple go with little or no attempt to retrieve it in order to shoot yet another bird. At best crippling losses are heavy in hunting any kind of game with the gun, but allowing preventable crippling losses is sheer waste of the resource on which we depend for our sport.

It is better yet to avoid making cripples by knowing the range of the gun and by refraining from making long shots in the hope of luckily bagging an occasional bird. A distant fowl lightly hit, later dying of the wound, is a total loss. Such checks as have been made indicate that careful hunters who know their guns and use them intelligently lose less than one in ten birds knocked down. The careless or incompetent gunner may lose as many as one out of two. Here is a chance for each duck hunter to help conserve our waterfowl population, both by per-

sonal example and by education among those of his acquaintance who for any reason are careless about crippling or leaving wounded birds.

There is still a third contribution all sportsmen can make toward the maintenance of wildfowling, and that is obeying the shooting regulations themselves and insisting that others do so. It has been a heartening thing in my present work to observe the increasing number of sportsmen who are willing to give to constituted authorities information on violations of the regulations.

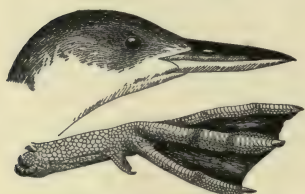
A growing body of sportsmen no longer consider it smart to violate the game laws. More and more gunners are coming to realize that game laws and game regulations are made for only one purpose—the perpetuation of their sport, and that the game warden and the authorities who make the regulations are working for the interest of the sportsmen. They are trying to make sure that there will be something to be harvested in future seasons. If the sportsmen of the country will fully cooperate, it will be possible to have greater populations of migratory waterfowl as well as other types of game. We have set as our present goal the doubling of the existing population. We believe that there are at least twice as many migratory waterfowl of all kinds on the North American continent as there were at the low point in 1934. We believe that there is room for at least twice as many as we now have. Having that capacity to care for the birds, it seems only common sense to try to build up our breeding stock to the maximum. When that has been accomplished we can hope to have a somewhat more abundant crop to harvest but we can never, without disastrous effects, go back to the good old careless days when we shot with no thought of the future.

LOONS, GREBES, RAILS, GALLINULES AND COOTS

These water birds are *not* ducks and do *not* belong to the same Family as the Ducks, Geese, and Swans, or even the same Order of birds.

Of these birds, the Rails and Gallinules are valued game species, and receive adequate protection; the others are not valued as game. Loons and Grebes are protected throughout the year in North America by International Treaty; their value is esthetic only; their economic status is of little importance as they are neither beneficial nor particularly harmful. Loons are said to consume large numbers of fish, but it has not been proved that they are, generally, seriously detrimental to the fishing interests; their gullets are small and they usually only tackle the smaller fishes. In addition to small fishes they feed on molluscs, crabs, frogs, leeches, aquatic insects, and certain water plants. Coots, in their huge flocks, have been accused at times, and in certain places, of exhausting the food supply of the more valued game species; they are much hunted and countless numbers pay the penalty every year. They are mainly vegetable feeders, and are particularly fond of wild celery and the foxtail grass, which are important duck foods. Grebes are generally conceded to be harmless little fellows.

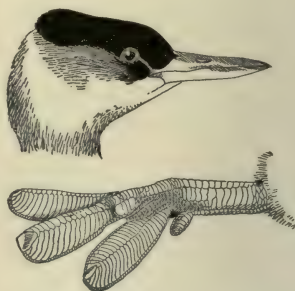
LOONS belong to the Family *Gaviidae*. There are six native North



Head and foot of Loon

American forms of loons. The characteristics of the family are: large diving birds; long, straight, narrow, pointed bills; tarsi much flattened laterally; front toes fully webbed. Especially noted for their diving powers and for the long distances they travel under water; rise with difficulty from the water; in flight the feet are trailed behind the tail. Of no importance as game birds.

GREBES (Hell-divers) belong to the Family *Colymbidae*. There are six native North American forms of Grebes. The characteristics of the family are: small diving birds; sharp, pointed, narrow bills, of varying length; tarsi much flattened laterally; front toes with broad lobes and small webs at base; no developed tail; legs so enclosed by the skin of the trunk that only the tarsi move freely; legs placed very far to the rear of body. Remarkably quick, active divers; rise quickly from the water; in flight the feet trail behind. Of no importance as game birds.



Head and foot of Grebe

RAILS, GALLINULES, and COOTS belong to the Family *Rallidae*. The family is divided into subfamilies as follows:

RAILS belong to the subfamily *Rallinae*. There are 15 native North American forms of Rails. The characteristics of the subfamily are: wading birds; seldom resort to swimming; bill sharp and pointed; legs long and strong and adapted for running; wings short and comparatively weak; body compressed and adapted for passing through close-growing reeds; head completely feathered and lacking frontal shield on forehead

(present in Gallinules and Coots). Escape danger by running and hiding rather than by flying. Of considerable importance as game birds.

GALLINULES (Mud-hens) belong to the subfamily *Gallinulinae*. There are two forms of Gallinules native to North America. The characteristics of the subfamily are: Rail-like birds; legs long as in Rails; bill somewhat like that of Coots, but frontal shield usually highly coloured in adult; toes long, rail-like, and not lobed as in Coots. Of considerable importance as game birds as the size is large and the flesh palatable.

COOTS belong to the subfamily *Fulicinae*. (Not to be confused with the Scoters, which are often called "coots," but which are

true ducks.) The American Coot is the only native North American form of this subfamily. The characteristics of the Coot are: rather large, duck-like birds; toes furnished with membranous lobes; bill and frontal shield as in Gallinules, but dead white instead of highly coloured. Dive quickly but rise from the water with difficulty; fly with feet trailing behind. Though large numbers are killed annually, they are not particularly valued as game birds.



Head and foot of Rail



Head and foot of Gallinule

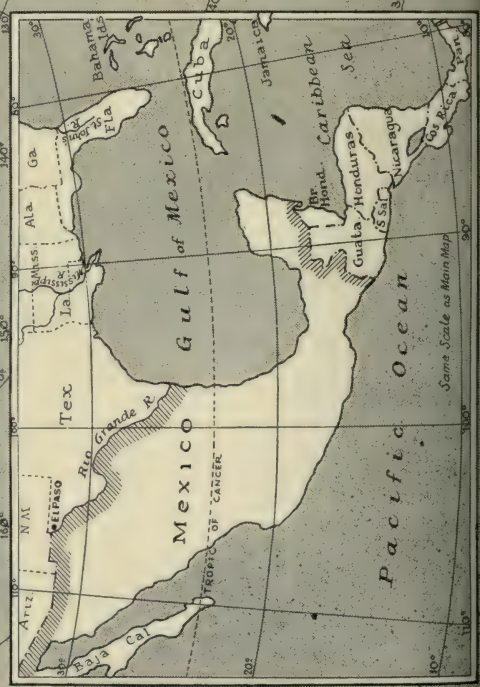


Head and foot of Coot



North America
Showing
Places mentioned in this Work

Scale of Miles
0 100 500 1000
F.P. LLOYD MAPS - TORONTO



DESCRIPTIONS, IDENTIFICATIONS
and
LIFE STORIES
of the
DUCKS, GEESE, AND SWANS

THE SWANS

Subfamily *Cygninae*

MUTE SWAN

Sthenelides olor
(*Cygnus olor*, of Peters)
(sthen-él-i-des, ó-lor; sig-nus)

Colour Plate No. 1.

SCIENTIFIC NAME

Sthenelides, from Latin *Stheneleis* or *Stheneleius*, the son of *Sthenelus*; in mythology, *Stheneleis* was changed into a swan *Olor*, Latin, meaning a swan *Cygnus*, Latin, meaning a swan.

COLLOQUIAL NAMES

None in North America. In England called swan, mute swan, or wild swan; and in France *cygne sauvage* (wild swan).

DESCRIPTION AND SPECIMEN IDENTIFICATION

ADULTS, BOTH SEXES. Entire *plumage*, white; *eye*, brown; narrow bluish-grey ring around eye; *bill*, upper mandible, pinkish red, tinged with orange, blackish area about nostril, along edges of mandibles and on *nail*; *lower mandible*, blackish at base, flesh-coloured towards tip; fleshy knob on forehead at base of bill, and naked area between eye and bill (*lores*), black; knob on forehead less conspicuous in female; *feet*, dusky.

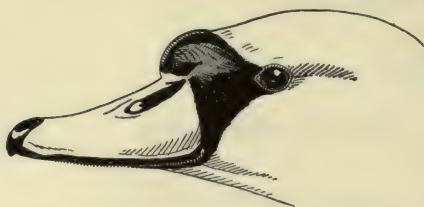


FIG. 36.—Head of Mute Swan

JUVENILE. Sexes alike, *all parts*, whitish, mottled, and tipped with greyish brown, *crown*, darkest, *breast*, lightest;

bill, blackish in very young birds, soon becoming dusky, suffused with flesh-colour; naked area between eye and bill, blackish; *feet*, dusky. Full white plumage of maturity probably not achieved for two years or longer.

FIELD MARKS

ON THE WATER. A very large, long-necked, all-white bird, with reddish bill having, in the male, a large black knob at its base. The neck is usually held curved, with the bill inclined downwards; the native swans usually hold the neck erect, and the bill horizontal. The feathers of the wings are capable of being raised, arch-fashion, over the back.

LIFE STORY

The Mute Swan, the swan of our parks and country estates, is not a native species, but was introduced from Europe. Actually this swan is not "mute," as when angry it hisses, and in calling its young makes a noise likened to the bark of a small dog. In its wild state in Denmark

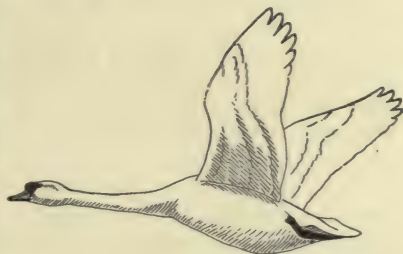
and other parts of northern Europe, and western Asia, it occasionally utters a loud trumpet-like note, especially in the spring. These swans live to a ripe old age, and there are records of birds reaching ages from 50 to 100 years; a common age, however, according to Dresser (1880), seems to be about 30 or 40 years. Any of these swans that are found along our coasts are those that have originally broken away from domesticated flocks and established themselves in the wild state. The male swan is a "cob," the female a "pen,"



the young in its first year a "cygnet," and in its second year, a "grey bird."

Beautiful, decorative, and graceful on water, the swans are awkward and clumsy on land, to which they resort unwillingly and for short periods only. Domesticated and tame as these birds become through their association with man, they are often most ferocious. There are records in England of the swans of the parks attacking young children and dogs approached too closely. Some were dragged into the water and killed by the angry birds.

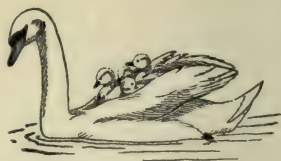
In England the swan is regarded as a royal bird, and no subject can own it except by grant from the crown. With this privilege the crown also grants a "swan-mark" which consists of a letter or some device that is cut into the upper mandible of the bird. This matter of the ownership of swans is an ancient custom, and the first enactment was in the reign of Edward IV, in the year 1482, when it was declared that "no person whatever, except the King's son, should have any swan-mark or game of swans of his own, or any other to his use, except he hath freehold lands and tenements to the clear yearly value of five marks" (Dresser, 1880). To this day the swans on the Thames belong to the King and to two city companies, the Dyers' and Vinters' Companies, all three having distinct swan-marks on their respective birds. Every year the swans are taken up from the water, the cygnets marked and the marks of the old birds renewed where this may be necessary; at the same time the young cygnets are pinioned to prevent them from flying away. The catching and marking of the swans in this manner is known as "swan-umping," and is conducted with some ceremony by the Swan-Uppers or Swan-Hoppers, who wear a special uniform.



These swans pair for life. Young pens do not lay until their second year and often not until three years old; they start by laying from 3 to 5 eggs in the first year of breeding, up to 7 in the second year, and when

they are mature the clutch will vary from 9 to 11 eggs. The eggs vary in size from a maximum of 4.92 by 3.15 inches to 4.41 by 2.84 inches. The period of incubation is about five weeks and even longer if the weather is cold. The nest is a bulky affair, built of aquatic herbage and is always placed in close proximity to water. While the female is setting, the male is particularly attentive and stands close guard to drive off any intruders. Incubation is performed by the female alone, but it is said that if accident should befall her, the male will continue the process and rear the young. During the mating season, mighty battles will take place among the young cobs for the possession of a mate.

"To my mind an old male swan seldom looks more beautiful than when 'on duty,' he sails forth from the margin of the stream to meet intruders; with his head and neck thrown back between his snowy pinions, and every feather quivering with excitement, he drives through the rippling water, contenting himself, if unmolested, with a quiet assertion of his rights, but with loud hisses and threatening actions resenting an attack. When the young too, under the joint convoy of their parents, have taken to the water, the actions of both birds are full of grace and vigour, and the deep call-notes of the old pair mingle with the soft whistlings of their downy nestlings. What prettier sight presents itself upon our inland waters with such a group disporting themselves in the bright sunshine of a summer's day, when the pure whiteness of the old birds' feathers contrasts with the green back-ground of reeds and rushes, and the little grey cygnets on their mother's back are peeping with bright bead-like eyes from the shelter of her spotless plumes? This habit of taking the young on her back is not, as some have supposed, adopted only as a means of safety when crossing a strong current, but is a method of brooding her young on the water, very commonly practised by the female swan whilst her cygnets are small; and she will sink herself low in the water that they may mount more easily. Whether at the same time she gives them a 'leg up' by raising them on the broad webs of her own feet I cannot say positively; but this is not improbable, since a favourite action in swans is that of swimming with one foot resting upon the lower part of the back, the sole of the foot being uppermost" (Stevenson and Southwell, 1866-90).



WHISTLING SWAN

Cygnus columbianus
(sig-nus, ko-lum-bi-á-nus)

Colour Plate No. 1

SCIENTIFIC NAME

Cygnus, Latin, meaning a swan; *columbianus*, Latinized form meaning, of the Columbia River.

COLLOQUIAL NAMES

IN GENERAL USE: Swan; whistler; wild swan. IN LOCAL USE: Cygne (swan); hoopers; tohawah (Alaskan Indian name); white swan.

DESCRIPTION

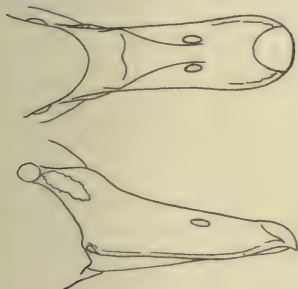


FIG. 37.—Bill of Whistling Swan.

ADULTS, BOTH SEXES. Entire *plumage* white, *head* and *neck* often stained rusty by certain waters. Four outer *primaries* emarginate for several inches at tips. *Tail*, short; *eye*, brown; *bill*, black; naked area between eye and base of bill (*lores*), usually with yellow or orange spot near eye; *nostril*, nearer tip of bill than eye, hind margin of nostril less than 2.35 inches from tip of bill; *feet*, black.

JUVENILE. By late autumn entire *plumage* pale ashy grey, darkest on *head*, lightest on *breast* and *belly*; *bill*, reddish flesh or purplish, tip, dusky; *feet*, livid flesh or becoming dusky. Full white plumage of maturity is probably not achieved for two years or longer. (Young Trumpeters have much yellow on the feet which young Whistlers never have.)

SPECIMEN IDENTIFICATION

From the Trumpeter Swan, the Whistler is told as follows: If the specimen has a yellow spot in front of the eye, it is a Whistling Swan. As this mark is not always present, its absence does not prove the specimen to be a Trumpeter. The position of the nostril in relation to eye and tip of bill (see above) is variable and, therefore, cannot be relied upon.

Trumpeter shows narrow salmon-red streak on edge of mandibles, lacking in Whistler. Size is the best guide and any specimen over 55 inches long, with bended wing over 23 inches, and weighing over 20 pounds is probably a Trumpeter.

The construction of the breast bone with the convolution of the windpipe provides positive identification (fig. 38). In the case of the Trumpeter, the windpipe makes a vertical loop over a hump in the

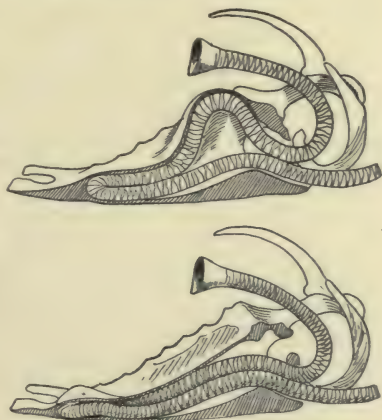
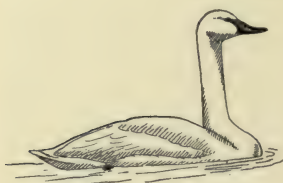


FIG. 38.—Above, windpipe of Trumpeter Swan; below, windpipe of Whistling Swan. Showing difference of convolution of windpipe within the breast-bone

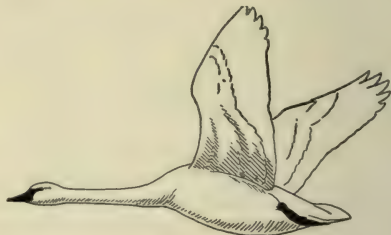
breast bone and emerges through a separate opening. In the Whistling Swan this extra loop is missing and the entrance and exit of the windpipe are through the same opening in the breast bone. The development of the windpipe within the breast bones is progressive with age; in young birds of the first autumn the windpipe barely enters the breast bone, but as the vertical loop in the Trumpeter develops more rapidly than the horizontal loop, this method of identification is of particular value in the case of juveniles. The Mute Swan is distinguished by its red bill, with black knob or "berry" at the base of the upper mandible.

FIELD MARKS

ADULTS. ON THE WATER. The appearance of a swan on the water is too well known to need comment. Swans are exceptionally fast swimmers. The Whistling Swan, though smaller than the Trumpeter, cannot with assurance be distinguished in life from that species except by the voice; the extreme rarity of the Trumpeter, however, precludes probability of confusion. On the water the Whistler and Trumpeter carry the neck erect and the bill horizontal, whereas the Mute Swan arches the neck gracefully with the bill inclined downwards. The feathers of the wings of all swans are capable of being raised, arch-fashion, over the back.



IN FLIGHT. The swan is easily recognized in flight by its very large, snow-white form, with long triangular, slow-moving wings, white to the tips; the thin outstretched neck, appearing like a mere line with a black point at the end, occupies more than half the length. The large black feet show distinctly behind the body, but do not extend beyond the tail. These swans pitch in to the water gracefully—without a splash and without extending the feet in front as do geese and ducks. When rising from the water these large birds must face the wind and they patter along the surface for 15 or 20 feet before clearing—a quick get-away for so heavy a bird. In migration they fly in small V-shaped flocks, and flock after flock follows in rapid succession. About their feeding grounds they move in curving lines or irregular formation. They fly faster than any of the ducks or geese.



VOICE. The voice is positive identification, but as swans are usually silent on the water this means of field identification is available only when the birds are in flight. The notes of the Whistling Swan are varied, loud and striking at times, and again soft trumpetings, like musical laughter; *wow-wow-ou*, heavily accented on the middle note; long whoops, or clucking sounds; repeated *who-who's*; a high flageolet-like note; varied murmurings from high to low. The note of the Trumpeter is of horn-like quality, very low in key but possessing extraordinary resonance; a clear, low, almost groaning, trumpet-like call.

LIFE STORY

The Whistling Swan is the common swan of North America. In size this magnificent snow-white bird ranks among our waterfowl as second only to the Trumpeter Swan. While the former vast numbers of these birds have been greatly reduced, they still exist in comparative abundance. The breeding grounds of this species are so remote, and the birds themselves are so wary and shy, that it is improbable that they will ever be exterminated or even much further reduced in numbers. Swans pair for life, and, once mated, never separate. The young keep with their parents for the first year, and during that period these little families are parted only by the death of their members. The male swan is a "cob," and the female, a "pen."

Of the start of the spring migration of these swans, Elliot (1898) says: "At the advent of spring the swan begin to show signs of uneasiness, and to make preparations for their long journey to the northward. They gather in large flocks and pass much of their time preening their feathers, keeping up a constant flow of loud notes, as though discussing the period of their departure and the method and direction of their course. At length all being in readiness, with loud screams and many *who-who's*, they mount into the air, and in long lines wing their way toward their breeding places amid the frozen north." E. S. Cameron, in notes quoted by Bent (1925) describing a flock of swans which had stopped off on a lake in Montana on their spring migration says: "These were grouped upon the southwest shore of the lake immediately below the ranch where the fine mountain stream called Alder Creek flows in. Some were standing upon one leg in 2 or 3 inches of water, others floated asleep behind these, with their heads under their wings, and farther away watchful birds, constituting a rear guard, were sailing about. With very few exceptions the swans held one leg along the side either when swimming or resting upon the water." Nelson (1887) says: "This fine bird arrives on the shore of Bering Sea in the vicinity of Mt. Michael early in May." Of the autumn migration, Turner (1886) says: "The young are able to leave the nest by the first week in July, and fly by the middle of September. They migrate about the middle of October . . . As many as 500 may form a single line, flying silently just over the shore line at a height of less than 600 feet."

All too frequently we read in our newspapers accounts of how the swans, migrating in the spring, have been brought to destruction in the Niagara swan trap. On their northward flight large numbers of these birds sometimes come to rest on the Niagara River above the famous falls. Occasionally some are carried over the falls by the rapids, dashed against the rocks or crushed by the ice, meeting their death in the whirlpools below. As many as 200 birds have met death in this manner at one time.

Concerning the courtship of this swan, A. M. Bailey, who witnessed

the display in Alaska, is quoted by Bent (1925) as follows: "I witnessed as pleasing a performance as it has been my privilege to see. The tundra was still clothed in its winter coat of white, although pools of brilliant colors had formed here and there by the melting snow. It was in the height of the spring migration, with hundreds of snow geese, little brown cranes, and shore birds in sight continually. Then, far out on the tundra I heard a different call, a clamoring, quavering call, first full and loud and gradually dying down. With the aid of the glasses I made out three swans, possibly two males performing for the benefit of the female. They walked about with arched necks proudly lifted, taking high steps, with wings outstretched, two birds occasionally bowing to each other, and as they performed, they continually kept calling. After a few minutes in a given place, they took to wing and drifted across the tundra a hundred yards, where the ceremony was then repeated."

The same writer describes the finding of a nest of this species as follows: "Both adults were seen sitting close to the edge of a pond, and, as we approached, they flew majestically away, only to circle and sail back directly over our heads There, near the water's edge, from

where the parent birds had taken flight, were three beautiful little downy young, which had just left the nest, some 25 feet away, and were doubtless ready to undertake their first swim. They were as fluffy as balls of yarn, with dark brown eyes, and bills and feet of pink flesh-color. They showed no fear, and cuddled contentedly when we held them in our hands. The nest was a conspicuous, built-up mound of moss on a ridge overlooking the little lagoon, and was unlined with down. . . . The swans are probably among the first birds to nest in the vicinity of Wales [Alaska]; the geese eggs were but half incubated at this time, while the loons' eggs were fresh. The swans owe their present-day numbers to



the fact that they nest over a wide stretch of barren country, uninhabited even by natives. They are continually persecuted on their breeding grounds, and were it not for their habit of nesting early, when the snow

is deep and too soft for travelling, they would have been exterminated long ago." Eifrig (1905) says: "They breed in lowlands with lakes, where their nests, constructed of seaweed, grass, and moss, are very conspicuous. They are very bulky affairs, about 3 feet in diameter at the base, tapering to 18 inches at the top, and 18 inches high."

This swan lays from 2 to 7 eggs, but the usual number seems to be 4 or 5. The eggs are creamy white or dull white when first laid, and average 4.21 by 2.68 inches. The period of incubation is said to be from 35 to 40 days. Nelson (1887) says of the young: "The last of June or first of July the young are hatched, and soon after the parents lead them to the vicinity of some large lake or stream, and there the old birds molt their quill feathers and are unable to fly. They are pursued by the natives at this season, and many are speared from canoes and kyaks. Although unable to fly, it is no easy task single handed to capture them alive. The young men among the Eskimo consider it a remarkable exhibition of fleetness and endurance for one of their number to capture a bird by running it down."

The length of time required for the juvenile to assume full adult plumage appears to be uncertain. Dr. Sharpless, quoted by Audubon (1840) says: "The swan requires five or six years to reach its perfect maturity of size and plumage, the yearling cygnet being about one-third the magnitude of the adult." Elliot (1898) says: "It is probable that it takes fully five years before the pure white dress is assumed and the bird becomes such an ornamental object." Baird, Brewer, and Ridgway (1884) make a similar statement. Bent (1925) says: "I can not believe that it takes a swan any such length of time to acquire its full plumage. . . . Hon. R. M. Barnes tells me that young swans, reared by him in confinement, acquired their full plumage during the second summer or fall, when 14 or 15 months old. I believe that this is usually the case with wild birds, though some traces of immaturity may not disappear until some time during the following winter or even spring."

"The food of the Whistling Swan is largely vegetable, which it obtains by reaching down with its long neck in shallow water, occasionally tipping up with its tail in the air when making an extra long reach. While a flock of swans is feeding in this manner, one or more birds are always on guard watching for approaching dangers, as the feeding birds often keep their heads and necks submerged for long periods. It apparently never dives for its food except in cases of great extremity. In Back Bay, Virginia, and in Currituck Sound, North Carolina, the Swans feast on the roots of the wild celery and fox-tail grass; they are now [1916] so numerous that they do considerable damage by treading great holes in the mud and by rooting and pulling up the celery and grass; they thus waste large quantities of these valuable duck foods, much more than they consume, and consequently spoil some of the best feeding grounds for ducks, much to the disgust of the sportsmen in the various clubs, who are not allowed to shoot the swans and have to submit to this

interference with their duck shooting. The swans are really such a nuisance in this particular locality that a reasonable amount of shooting might well be allowed; these birds are so wary that there is little danger of any great number being killed" (Bent, 1925).

Regarding the flight of swans, the same writer says: "Considering its size and weight, a swan rises from the water with remarkable ease and celerity; it runs along the surface for 15 or 20 feet, flapping its wings and beating the water with its feet alternately, until it has gained sufficient headway to launch into the air; like all heavy-bodied birds it must face the wind in rising. When well a-wing it flies with considerable speed and power, with the long neck stretched out in front and the great black feet extending beyond the tail; the wing beats are slow, but powerful and effective. It has been said to fly at a speed of 100 miles an hour; probably no such speed is attained, however, except when flying before a heavy wind; it undoubtedly flies faster . . . than any of the ducks and geese. When traveling long distances swans fly in V-shaped wedges, in the same manner as geese and for the same reason; the resistance of the air is less, as each bird flies in the widening wake of its predecessor; the leader, of course, has the hardest work to do, as he 'breaks the trail,' but he is relieved at intervals and drops back into the flock to rest. On shorter flights they fly in long curving lines or in irregular flocks. They usually fly rather high, and when traveling are often way up above the clouds."

"The ease and grace with which a swan swims on the surface of the water is too well known and too far famed to need any further comment; there is no prettier picture, no grander picture, than a party of these beautiful birds floating undisturbed on the mirror surface of some northern mountain lake against the rugged background of one of nature's wildest spots. But few people realize the speed and power of the swan as a swimmer until they have tried to chase one in a boat and seen how easily he escaped, even against wind and waves, without recourse to flight" (Bent, 1925). E. S. Cameron, in notes quoted by Bent, says: "A compact flock of from 4 to 6 swift-flying swans will circle the whole basin of the lake several times, and then, as if tied together, alight in the closest proximity to each other, yet never collide. They will pitch upon the water in the most graceful manner imaginable, without bringing their long legs forward, or making any splash. At exceptional times, however, the swans do make a loud splash when they alight."

The ancients called the Swan, The Bird of Apollo, or of Orpheus, and ascribed to it remarkable musical powers, which it was supposed to exercise particularly when its death approached. Down the ages "The Song of the Dying Swan" or the "Lament of the Swan," has been referred to in literature, and is a phrase familiar to everyone. In the Dialogues of Plato, Socrates, born 469 B. C., referring to the swans, says: ". . . when they perceive that they must die, having sung all their life long, do then sing more than ever, rejoicing in the thought that they are

about to go away to the god whose ministers they are. But men, because they are themselves afraid of death, slanderously affirm of the swans that they sing a lament I do not believe this to be true they sing and rejoice in that day more than they ever did before."

On the other hand, Dr. Elliott Coues, famed ornithologist, in his "Key to North American Birds" (1887), says of swans: ". . . . it is hardly necessary to add, that their fancied musical ability, either in health or at the approach of death, is feigned by poets but not confirmed by examination of their vocal apparatus there are no muscles nor other apparatus for modulating the voice musically."

Finally, in confirmation of the claims of the ancients and the poets, Dr. D. G. Elliot (1898), reliable observer and celebrated naturalist, relates: "I had killed many swan and never heard aught from them at any time, save the familiar notes that reach the ears of everyone in their vicinity. But once, when shooting in Currituck Sound over water belonging to a club of which I am a member, in company with a friend, Mr. F. W. Leggett, of New York, a number of swan passed over us at a considerable height. We fired at them, and one splendid bird was mortally hurt. On receiving his wound the wings became fixed and he commenced at once his song, which was continued until the water was reached, nearly half a mile away. I am perfectly familiar with every note a swan is accustomed to utter, but never before nor since have I heard any like those sung by this stricken bird. Most plaintive in character and musical in tone, it sounded at times like the soft running of the notes in an octave, and as the sound was borne to us, mellowed by the distance, we stood astonished and could only exclaim, 'We have heard the song of the dying swan'."

"As game birds, swans have never held a prominent place. They are not abundant anywhere except in a few favored spots, as migrants or winter sojourners. They have always been so wary and shy that attempts to shoot them in any considerable numbers generally resulted in making them wilder than ever or in driving them away altogether. The flesh of the younger birds is comparatively tender and palatable, but the older birds are very tough. Swans always have been attractive marks for sportsmen on account of their large size and spectacular appearance, but comparatively few have ever enjoyed the privilege of shooting at them formerly they were shot in considerable numbers in the vicinity of Chesapeake Bay and Currituck Sound. They were shot mainly from the marshy points where blinds were built for duck shooting; the swans were wont to feed along the shores of the marshy coves and bays; and in passing . . . around or over these points, offered tempting shots. It was an exciting moment for the sportsman when he saw a flock of these great white birds approaching and few could resist the temptation to shoot at them." (Bent, 1925.)

Young swans are esteemed a great delicacy for the table and Yarrell (1843) gives the following recipe as the standard guide for their cookery

TO ROAST A SWAN

Take three pounds of beef, beat fine in a mortar,
Put it into the Swan—that is when you've caught her;
Some pepper, sauce, mace, some nutmeg, an onion,
Will heighten the flavor in gourmand's opinion.
Then tie it up tight with a small piece of tape,
That the gravy and other things may not escape.
A meal paste, rather stiff, should be laid on the breast,
And some whited brown paper should cover the rest.
Fifteen minutes at least ere the Swan you take down,
Pull the paste off the bird that the breast may get brown.

THE GRAVY

To a gravy of beef, good and strong, I opine,
You'll be right if you add half a pint of port wine;
Pour this through the Swan—yes, quite through the belly.
Then serve the whole up with some hot currant-jelly.
N.B. The Swan must *not* be skinned.

At present all wild swans are protected in all parts of Canada, the United States, and Alaska by a complete closed season throughout the year.

TRUMPETER SWAN

Cygnus buccinator
(sig-nus, buk-si-ná-tor)

Colour Plate No. 1.

SCIENTIFIC NAME

Cygnus, Latin, meaning a swan, and *buccinator*, meaning a trumpeter.

COLLOQUIAL NAMES

IN GENERAL USE: Swan; wild swan. IN LOCAL USE: Bugler; cygne (swan).

DESCRIPTION

ADULTS, BOTH SEXES. Entire *plumage* white; *head*, *neck* and *under surface*, often stained rusty from certain waters. *Eye*, brown; *feet*, black; *bill*, black, with narrow salmon-red streak on edge of mandibles, lacking in Whistling Swan; the naked area, between eye and base of bill, *lores*, never with yellow spot as in Whistling Swan; *bill*, somewhat longer and broader at tip than in that species; *nostril*, usually further from tip of bill than in Whistling Swan, the hind margin of nostril being more than 2.5 inches from tip of bill. Four outer primaries emarginate for several inches at tips.

JUVENILE. In first winter general colour, greyish white, slightly tinged with yellow. Upper part of *head* and *cheeks* light, reddish brown; *feet*, dull yellowish brown, tinged with olive; *bill*, black, with middle portion of ridge, light flesh colour; edge of lower mandible, dull flesh colour. (Young Trumpeters have much yellow on the feet which young Whistlers never have.)

SPECIMEN IDENTIFICATION AND FIELD MARKS

See Whistling Swan.

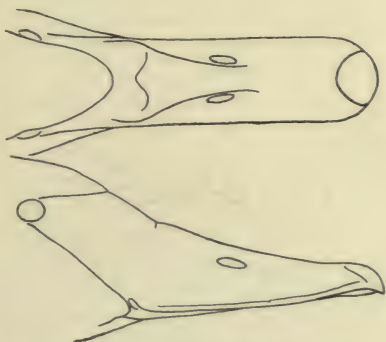


FIG. 39.—Bill of Trumpeter Swan

LIFE STORY

The magnificent Trumpeter Swan, "the largest of all the North American wildfowl, belongs to a vanishing race; though once common throughout all of the central and northern portions of the continent, it has been gradually receding before the advance of civilization and agriculture; when the great Central West was wild and uncultivated it was known to breed in the uninhabited parts of many of our Central States, even as far south as northern Missouri; but now it probably does not breed anywhere within the limits of the United States, except possibly in some of the wilder portions of Montana or Wyoming; civilization has pushed it farther and farther north until now it is making its last stand in the uninhabited wilds of northern Canada" (Bent, 1925).

The history of its disappearance is summed up by Forbush (1912) as follows: "The Trumpeter has succumbed to incessant persecution in all parts of its range, and its total extinction is now only a matter of years. Persecution drove it from the northern parts of its winter range

to the shores of the Gulf of Mexico; from all the southern portion of its breeding range toward the shores of the Arctic Ocean; and from the Atlantic and Pacific slopes toward the interior. Now it has almost disappeared from the Gulf States. A swan seen at any time of the year in most parts of the United States is the signal for every man with a gun to pursue it . . . the bird is pursued, even in its farthest northern haunts, by the natives, who capture it in summer, when it has molted its primaries and is unable to fly . . . The large size of this bird and its conspicuousness have served, as in the case of the Whooping Crane, to make it a shining mark, and the trumpetings that were once heard over the breadth of a great continent, as the long converging lines drove on from zone to zone, will soon be heard no more."

Of the behaviour of this species, Audubon (1840) says: "The flight of the Trumpeter Swan is firm, at times greatly elevated and sustained. It passes through the air by regular beats, in the same manner as geese, the neck stretched to its full length, as are the feet, which project beyond the tail . . . If bound to a distant place, they form themselves in angular lines, and probably the leader of the flock is one of the oldest of the males; but of this I am not at all sure, as I have seen at the head of a line a gray bird, which must have been a young one of that year . . .

"When swimming unmolested the swan shows the body buoyed up; but when apprehensive of danger, it sinks considerably lower. If resting and basking in the sunshine, it draws one foot expanded curiously toward the back, and in that posture remains often for half an hour at a time . . . Unless during the courting season, or while passing by its mate, I never saw a swan with the wings raised and expanded, as it is alleged they do, to profit by the breeze that may blow to assist their progress; and yet I have pursued some in canoes to a considerable distance, and that without overtaking them, or even obliging them to take wing."

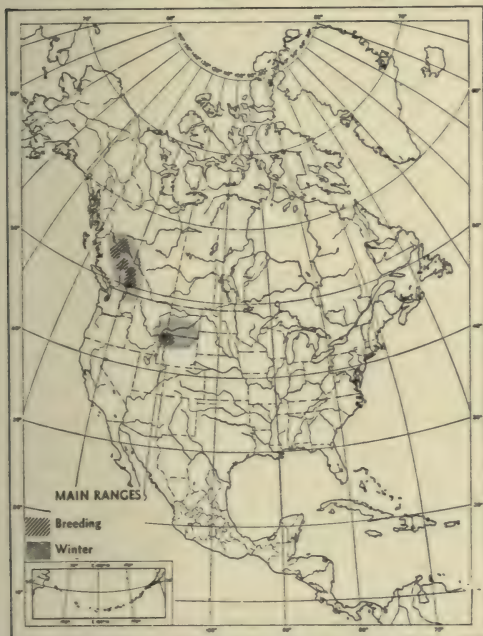
Of the problem of the conservation of the Trumpeter, and its present status, Allan Brooks (1934) says: This swan, "one of the largest living native birds of North America, presents a problem for its perpetuation that requires all the intelligence and effort that conservationists can concentrate on it . . . I greatly doubt the stories of the former abundance of the Trumpeter. Many of these, as well as some of the records of its recent capture, are based on the old diagnosis for distinguishing the two species. Formerly all adult swans that did not show a yellow mark on the bill were called Trumpeters. Now we know that many adult Whistlers have an all-black bill, and all other distinctions are more or less unreliable, except the different characters of the windpipe and sternum [described under "Specimen Identification"] . . . The ranges of the two species are very different. Simply put, the Whistler summers as far north as he can and winters as far south, while the Trumpeter breeds as far south as he can find the necessary solitude and winters precariously as far north as he can find open fresh water.

"Outside of a few pairs in Yellowstone National Park, the main stronghold of the Trumpeter now is in northern British Columbia. Pos-

sibly 500 birds are scattered through that rugged region in the summer. Concentrations of more than 200 birds have been counted recently in places where unfrozen water was available in the interior, and we know that there were several other points in the country where smaller numbers were present. Contrary to the general belief, these birds are not molested by man except in rare instances, and even in early days few were shot, although the young birds are excellent eating. The great

danger lies in their enemies on the nesting grounds. Eagles and ravens were probably their chief menace at one time, but now the increased range of the coyote, which has invaded parts of the country which formerly offered them haven as their most inviolate sanctuaries, spells nothing but complete disaster unless some remedial action can miraculously save them."

Taverner (1938) says: "The Trumpeter was at one time a fairly common migrant in the Great Lakes section and a regular nester throughout the prairies and British Columbia. Now, only a few small flocks and individual pairs are known in British Columbia, Alberta, and in the Yellowstone National Park,



Wyoming. The causes of its nearly complete disappearance were various. It nested in what is now well-inhabited country and it is very difficult to retain such a spectacular bird in communities that are much shot over. Swans are not prolific and once their number is reduced it takes several generations of undisturbed peace to restore them. They are not nearly so wild nor so difficult to kill as the still common Whistling Swan. The latter migrates in great flocks that pitch out in the middle of the larger waters, rarely coming inshore except at night, or when it is perfectly certain that there is no danger. In spite of their great numbers, very few Whistling Swans are shot. The Trumpeter, on the other hand, travels in smaller companies, often family groups, coasts the shore more frequently, often passing the hunter's blind. This difference in habit may have been a determining factor in the disappearance of this bird over most of its range, where the Whistling Swan has survived. In the early days, the Hudson's Bay Company did a very large trade in swan's breast skins; The Trumpeter, being the larger and more valuable bird and more easily

killed, was probably cleared from its more northern ranges at an early date.

"At present, strenuous efforts are being made to preserve the last remaining individuals of this beautiful species. Attempts have been made to make reserves of waters they frequent, but they refuse to stay in narrow but safe confines and their numbers are still diminishing. Unfortunately, only the stations at the winter end of the migratory range can be reserved, the other end is scattered and difficult to protect from occasional intruders. A single visit of an irresponsible white or Indian may occur at any time on the loneliest lakes of the northland and destroy a small community, and it has now come to the point where every pair counts. Naturally, under these conditions, exact information as to the localities these birds frequent has been kept confidential, but it is also necessary that no information of this kind should be lost. All who know of a new station for these birds are urged to communicate with the officials responsible for their protection, not only to assist them in the present, but that the data may be preserved until such time as it is safe to publish it more widely."

In Canada, the present wintering population of the Trumpeter Swan is estimated to be at least 500, the flocks being located in the wilds of British Columbia. In the United States the population in 1940 was 117, the flocks being found in Yellowstone National Park, Wyoming, and at Red Rock Lake Sanctuary, close by in Montana.

The Trumpeter Swan builds its nest of tules or other aquatic vegetation of the vicinity, and will often establish itself on the top of muskrat houses or deserted beaver lodges; the nest is a huge affair, five or more feet across at the bottom, and similar to that of the Whistling Swan. This swan is said to lay from 2 to 10 eggs, but probably the usual set is from 4 to 6. The eggs are dull white or creamy white when first laid, and average 4.33 by 2.80 inches.

The voice of the Trumpeter Swan was recorded by Dr. A. A. Allen. A pair of swans with two cygnets were observed on Lower Red Lake, Montana, and the cygnets were driven into a blind, captured, and imprisoned in a wire cylinder which was placed near the microphone. Dr. Allen (1937) says: "Within ten minutes the swans had found their youngsters and were talking to them—into the waiting microphone. In a few minutes we had the sounds of both young and old safely recorded. I then pulled gently on the string, capsizing the cylinder and releasing the young without their knowing just what had happened and without their realizing that we were anywhere around. The little cygnets swam from one parent to the other, talking back and forth and gradually moving up the lake again. They were none the worse for having been our prisoners for a few minutes so that we could make a permanent record of their voices that will go down through the years, even though all their kind should vanish from the earth."

The age to which these swans live in the wild state is, of course, not known, but one of these birds, in captivity, lived for 32½ years.

THE GEESESubfamily *Anserinae***The Canada Goose**

The species *Branta canadensis*, the Canada Goose, is composed of five varieties or subspecies, as follows: (1) Common Canada Goose, *c. canadensis*; (2) Western Canada Goose, *c. occidentalis*; (3) Lesser Canada Goose, *c. leucopareia*; (4) Richardson's Goose, *c. hutchinsi*; (5) Cackling Goose, *c. minima*.

All these geese are similarly marked, the outstanding features being the long black neck or "stocking," and the white cheeks. The main points of distinction between the varieties are differences of size and shade of body colour. In this regard the subspecies stand as follows: There are two large birds (9 pounds approx.), the Common Canada Goose or Honker, light coloured, and the Western Canada Goose, dark coloured. Then comes one medium sized bird (5 pounds approx.), the Lesser Canada Goose, light coloured. And finally there are two very small birds (3½ pounds approx.), Richardson's Goose, light coloured, and the Cackling Goose, dark coloured. Reference to Colour Plate No. 2 will make clear these differences of size and colour.

The birds referred to in this work as (1) Richardson's Goose and (2) Western Canada Goose, are listed in the 1931 Edition of the A.O.U. Check List as "Hutchins's Goose," and "White-cheeked Goose," respectively. This departure from the nomenclature of the A.O.U. is made for the following reasons:

(1) Richardson's Goose. For a great many years the name "Hutchins's Goose," as a variety of this species, has been misapplied, and the confusion was unfortunately added to by the changes made in the nomenclature of the species in the 1931 Edition of the A.O.U. Check List. The facts are as follows:

In 1831 Sir John Richardson discovered in the Hudson Bay region a very small goose, which he called Hutchins's Goose, *hutchinsi*, for Mr. Hutchins of the Hudson Bay Company. In the course of years this little goose was either forgotten or overlooked by naturalists, and in all literature the name Hutchins's Goose has been erroneously applied to a goose now known as the Lesser Canada Goose, a bird distinct from the one originally named "Hutchins's" by Richardson, its discoverer.

When, a relatively short time ago, this little Richardson's Goose was rediscovered, the A.O.U., in the 1931 Check List, re-bestowed upon it its original names, Hutchins's Goose, and *hutchinsi*. The bird which had been known for so long as Hutchins's, and which for the moment had no name, was called the Lesser Canada Goose, *c. leucopareia*.

If the nomenclature in the 1931 Edition of the Check List is allowed to stand, the present confusion will be perpetuated. And, it will always be necessary to realize that the bird called Hutchins's Goose since 1931,

though properly entitled to the name, as being the original possessor thereof, is an entirely different bird from the one with which the name has been associated for such a long time.

The simple way out of the difficulty is to drop the vernacular name Hutchins's altogether and to give the bird on which it was originally bestowed, the vernacular name of Richardson's Goose, and the scientific name *hutchinsi*, thus obviating confusion and at the same time doing honour both to the original discoverer and to the man for whom he named the bird. This plan has been adopted in this work.

(2) Western Canada Goose. The other deviation from the nomenclature of the 1931 Check List is in the case of the bird herein called Western Canada Goose instead of "White-cheeked Goose." This bird is exclusively *western* in its range, and its scientific name is *occidentalis*, which means "western," therefore the change is logical. Furthermore, the scientific name of the Lesser Canada Goose is *leucopareia*, which means "white-cheeked." Thus in the 1931 Check List there exists the anomaly of one bird whose *vernacular name* is *White-cheeked* and an entirely different bird whose *scientific name* is *white-cheeked*. This minor change will avoid inevitable confusion.

Both of the above changes in common names are at present being considered by the appropriate committee of the A.O.U. It is believed and hoped that they will see fit to make these essential alterations in the forthcoming edition of the Check List.

Common Canada Goose

Branta canadensis canadensis

(brán-ta, kan-a-dén-sis)

Colour Plate No. 2. Downy Young No. 32.

(A subspecies of the Canada Goose)

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos*, being the Aristotelian name of an unknown bird; *canadensis*, Latinized form, meaning of Canada.

COLLOQUIAL NAMES

IN GENERAL USE: Honker, varied to honker goose, big honker, Canada honker, old honker, and corrupted to hunker and hunter. IN LOCAL USE: Bay goose; bernache (French name of the barnacle goose); big Mexican goose; blackie; black-necked goose; brant; French goose; Mexican goose; nigger goose; northern goose; outarde (bustard); reef goose; ringneck; ringneck goose; wavy.

DESCRIPTION

ADULTS, BOTH SEXES. *Head* and *neck*, shiny black; black "stocking," as the long black neck is called, ending abruptly at base of neck; each *cheek* with white or whitish patch, the two patches usually meeting under *throat*, sometimes stained rusty; *chin*, usually dusky; *bill*, black, shorter than head and with broad *nail*; *eye*, brown. *Body*. *Back* and *scapulars*, brownish grey, each feather narrowly tipped with lighter, producing a finely-barred effect; *rump*, black; *chest* and *breast*, pale ashy grey, with whitish tips to feathers; *belly* and *flanks*, white; *sides*, brown-

ish grey, barred with white; *underparts*, sometimes stained rusty; *feet*, black. *Tail*, black; upper and under *coverts*, white. *Wings*. All *coverts*, brownish grey with pale edging to the feathers; *primaries*, dusky, the three outer primaries emarginate on inner web near tip, fourth tapering; *secondaries*, outer webs, greyish, inner webs, dusky; *tertials*, greyish brown; *lining* and *axillars*, light greyish brown.

JUVENILE. During first autumn young birds closely resemble adults but colours are duller and more blended, Head and neck duller, browner black; *cheeks* more brownish white, sometimes barred or speckled with dusky, and edges of black areas not so clearly cut; light edgings above not so distinct, and sides of *chest* and *sides* indistinctly mottled, rather than clearly barred; *breast* darker than in adults; upper *tail-coverts* whitish, marked with brownish grey at tips. During autumn and winter these differences disappear by means of wear and moult, so that by spring young birds are practically indistinguishable from adults.

SPECIMEN IDENTIFICATION

ADULTS BOTH SEXES. General effect: A very large, brownish-grey goose, with head and full length of neck, black, except for white cheek-patches. This colour pattern will distinguish the "Honker" from all geese except the other varieties of the Canada Goose. The Barnacle Goose, which also has white cheeks, has the forehead white as well.

There are five varieties or subspecies of *Branta canadensis*, the Canada Goose. Three are of the comparatively pale body colour of the "Honker" and two are much darker.

The three light-coloured birds are: Common Canada Goose, a very large bird (9 pounds approximately); Lesser Canada Goose, a medium-sized bird (5 pounds approximately); and Richardson's Goose, a small bird (4 pounds approximately). The two dark forms are: Western Canada Goose, a very large bird, about the same size as the Common Canada Goose; and Cackling Goose, the smallest of the tribe (3 pounds approximately). The two dark varieties are exclusively birds of the west coast.

As there is no difference in size between the two large varieties, Common Canada Goose and Western Canada Goose, the colour shade of body plumage is the chief distinguishing feature.

Colour of body plumage is again the chief feature distinguishing the two small varieties, Richardson's and Cackling Goose, though the former bird averages heavier than the latter.

The Lesser Canada Goose is of exactly the same coloration as the Common Canada Goose and is only distinguished by being about half the size.

For details of colour variations and other minor differences see "Descriptions."

Intergradation probably occurs between the different subspecies of the Canada Goose, as many specimens are recorded which are difficult to determine with certainty.

JUVENILES. Immature birds are very similar to adults. See "Descriptions."

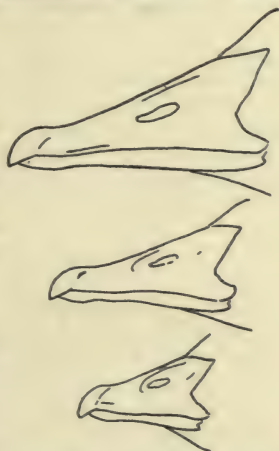
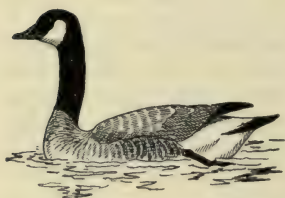


FIG. 40.—Comparative sizes of bills of Canada Geese. Top, Common Canada Goose and Western Canada Goose, Middle, Lesser Canada Goose, Bottom, Richardson's Goose and Cackling Goose.

FIELD MARKS

ON THE WATER. Whether sitting on the water or grazing on land, these brownish-grey geese, with the long black necks of the sentinels held straight upright, are instantly recognized. The white cheek-patches and the clearly defined base of the black "stocking" are characteristic and are readily noticed. They swim gracefully after the manner of swans and can make rapid progress if necessary. (The differences in size and coloration of the five varieties of Canada Geese are outlined under the heading "Specimen Identification" above.)



IN FLIGHT. The large, greyish bodies with the long black necks outstretched in a slight downward curve are unmistakable. On their feeding grounds, or on short flights, they fly in compact or irregular bunches, with an apparently laboured flight. On migrations they fly in the well-known V-shaped flocks or sometimes in a long, single, sloping line, or more rarely in Indian file. In rising from the water they run along for a few steps before clearing, but if suddenly surprised and in full plumage, they spring clear with a single bound. When about to alight, they set their wings, glide down to the water and drop in with a splash.



VOICE. A loud resonant *honk*, *honk* (or *ong*, *ong*), uttered in flight and on the water, and a number of chatty intimate cries when feeding. When feeding quietly an individual will occasionally emit a long drawn-out-cry—*h-o-n-k*, *h-o-n-k*, *h-o-n-k*, *honk*, *ong*, *uf*.

LIFE STORY

Sagacity, wariness, strength, and fidelity are characteristics of the Canada Goose which, collectively, are possessed in the same degree by no other bird. The Canada in many respects may serve as a model for man.

This grandest of all waterfowl cannot be more fittingly introduced than in the words of Bent (1925): "The common wild goose is the most widely distributed and the most generally well-known of any of our wild fowl. From the Atlantic to the Pacific, and from the Gulf of Mexico nearly to the Arctic coast, it may be seen at some season of the year, and when once seen its grandeur creates an impression on the mind which even the casual observer never forgets. As the clarion notes float downward on the still night air, who can resist the temptation to rush out of doors and peer into the darkness for a possible glimpse at the passing flock, as the shadowy forms glide over our roofs on their long journey? Or, even in daylight, what man so busy that he will not pause and look upward at the serried ranks of our grandest wild fowl, as their well-known honking notes announce their coming and their going, he knows not whence or whither? It is an impressive sight well worthy of his gaze; perhaps he will even stop to count the birds in the two long converging

lines, he is sure to tell his friends about it, and perhaps it will even be published in the local paper, as a harbinger of spring or a foreboding of winter. Certainly the Canada Goose commands respect."

In size the Common Canada Goose is second only to the swans. It has a wing spread between 5 and 6½ feet and ranges in weight from 7 to 14 pounds; it is claimed that specimens have been shot weighing up to 18 pounds. On account of its great size and excellent table properties it has probably been hunted as persistently as any other game bird of this continent. Bent (1925) says: "It is so wary, so sagacious, and so difficult to outwit that its pursuit has always fascinated the keen sportsman and taxed his skill and his ingenuity more than any other game bird." By fair means and foul this wonderful bird has been bagged by countless thousands over the years. In spite of the most murderous onslaughts it has somehow managed to hold its own and under the more enlightened game laws of today will probably materially increase in numbers. Let us hope so.

On migration, Canada Geese often assume the well-known V-shaped formation, with the leader at the head. From time to time during long flights change of leadership will take place. The familiar, resonant *honk-*

honk of these geese in flight, as the leader calls to his flock and they respond at frequent intervals, never loses its mystic charm. As Bent (1925) says: "The old ganders know the way and lead their trustful flocks by the straightest and safest route; high in the air, with the earth spread out below them like a map, they follow no coast line, no mountain chain, and no river valley; but directly onward over hill and valley, river and lake, forest and plain, city, town, and country, their course points straight to their summer homes. Flying by night or by day, as circumstances require, they stop only when

necessary to rest or feed, and then only in such places as their experienced leaders know to be safe."

The same writer says: "When flying about their feeding grounds or elsewhere on short flights, they fly in compact or irregular bunches. Their flight then seems heavy and labored, but it is really much stronger and swifter than it seems, and for such heavy birds they are really quite agile. It is only when travelling long distances that they fly high in the air in the well-known V-shaped flocks, which experience has taught them is the easiest and most convenient for rapid and protracted flight. In this formation the leader, cleaving the air in advance, has the hardest work



to perform . . . the others follow along in the diverging lines at regular intervals, so spaced that each has room enough to work his wings freely, to see clearly ahead, and to save resistance in the wake of the bird ahead of him. As the wing-beats are not always in perfect unison, the line seems to have an undulatory motion, especially noticeable when near at hand; but often the flock seems to move along in perfect step. Flight is not always maintained in the stereotyped wedge formation; sometimes a single, long, sloping line is formed or more rarely they progress in Indian file."

The wariness and sagacity of these birds are remarkable. When feeding on land or water the flocks are well guarded by sentinels, two or more long black necks are always stretched up on the lookout for approaching danger. At a warning from a sentry every head is immediately raised and, if deemed necessary, the flock takes wing. They are very keen of sight and hearing and are able to detect differences in the sounds of approach; a deer breaking a twig as it walks causes no alarm but the cracking of a twig by an approaching hunter will startle them to flight; a horse or a cow will pass without apparent attention but the proximity of a bear or coyote is instantly announced. The sound of a splashing fish or a flopping turtle cause no alarm but at the faintest splash of a paddle up goes every head and in silence they watch for the approach of the enemy. A moving automobile is ignored but if it stops in their vicinity they take flight. A bear or a coyote may approach but never near enough to be a menace; they keep edging away and permit such enemies to come no closer than twenty or thirty feet. Wary as they are, they are so intelligent that they readily discriminate between man the enemy, and man the friend. This is best exemplified by their tameness and trustfulness when they visit the preserve of the famous Jack Miner at Kingsville, Ontario.

Canada Geese are wily, cunning birds and adopt many clever ruses in the avoidance of danger when, in their judgment, strategy is better



suited to the case than taking flight. To avoid detection they will lie flat with long necks outstretched and without the slightest movement. This they do while on their nests, on gravelly beaches where they look like pieces of driftwood, among boulders, on sandbars, and in the grass. On the water the inert, gently rocked body with head resting on the surface looks not at all like a bird; on the ice in this pose they are most inconspicuous. When hiding in this manner they provide excellent examples of protective coloration. Before breaking the pose they wait until the enemy has retired to a considerable distance. Then, gradually, one by one, the heads are cautiously raised until the birds are finally satisfied. If on land, they stand up and sneak off into any available cover to make doubly sure of their safety.

Contrary to the habit of ducks which seek new spouses each year, the Canada Goose mates for life; should either partner die or be killed the survivor, it is said, never pairs again. (No verification of this statement has been found by the author in his research nor, to his knowledge, has it been disproved). The courtship is described graphically by Audubon (1840) as follows: "It is extremely amusing to witness the courtship of the Canada Goose in all its stages; and let me assure you, reader, that although a gander does not strut before his beloved with the pomposity of a turkey, or the grace of a dove, his ways are quite as agreeable to the female of his choice. I can imagine before me one who has just accomplished the defeat of another male after a struggle of half an hour or more. He advances gallantly toward the object of contention, his head scarcely raised an inch from the ground, his bill open to its full stretch, his fleshy tongue elevated, his eyes darting fiery glances, and as he moves he hisses loudly, while the emotion which he experiences causes his quills to shake and his feathers to rustle. Now he is close to her who in his eyes is all loveliness; his neck bending gracefully in all directions, passes all around her, and occasionally touches her body; and as she congratulates him on his victory, and acknowledges his affection, they move their necks in a hundred curious ways. At this moment fierce jealousy urges the defeated gander to renew his efforts to obtain his love; he advances apace, his eye glowing with the fire of rage; he shakes his broad wings, ruffles up his whole plumage, and as he rushes on the foe, hisses with the intensity of anger. The whole flock seems to stand amazed, and opening up a space, the birds gather round to view the combat. The bold bird who has been caressing his mate scarcely deigns to take notice of his foe, but seems to send a scornful glance toward him. He of the mortified feelings, however, raises his body half opens his sinewy wings, and with a powerful blow, sends forth his defiance. The affront cannot be borne in the presence of so large a company, nor indeed is there much disposition to bear it in any circumstances; the blow is returned with vigor, the aggressor reels for a moment, but he soon recovers, and now the combat rages. Were the weapons more deadly, feats of chivalry would now be performed; as it is,

thrust and blow succeed each other like the strokes of hammers driven by sturdy forgers. But now, the mated gander has caught hold of his antagonist's head with his bill; no bulldog can cling faster to his victim; he squeezes him with all the energy of rage, lashes him with his powerful wings, and at length drives him away, spreads out his pinions, runs with joy to his mate, and fills the air with cries of exultation."

The Canada Goose usually nests on the ground near water. The type of nest will vary considerably with the locality. Generally the nest is a



depression in the ground lined with material from the vicinity, sticks, flags or grasses, and soft grey down. Sometimes the nests are large, bulky affairs of about two feet outside diameter, and again they may be mere depressions with scanty lining of any sort. In certain parts of the country nests will occasionally be found in trees, and in such instances are often

the disused nests of ospreys, hawks, or other large birds. The number of eggs varies from 4 to 10, but the usual set consists of 5 or 6. The eggs when freshly laid are of a creamy-white colour and the average size is 3.37 by 2.29 inches. The period of incubation is from 28 to 30 days and is performed by the goose alone. While the gander never sits on the eggs, he is always in close attendance, ready to protect the family from any danger.

It is during the breeding season that the gander displays to the greatest advantage his staunchness as a defender of his family. Audubon (1840), quoting an instance says: ". . . whenever I visited the nest it [the gander] seemed to look upon me with utter contempt. It would stand in a stately attitude until I reached within a few yards of the nest, when, suddenly lowering its head and shaking it as if it were dislocated from the neck, it would open its wings and launch into the air, flying directly at me. So daring was this fine fellow that in two instances he struck me a blow with one of his wings on the right arm, which for an instant I thought was broken. I observed that immediately after such an effort to defend his nest and mate he would run swiftly toward them, pass his head and neck several times over and around the female, and again assume his attitude of defiance."

One hundred years have elapsed since Audubon wrote the above words, but the following newspaper extract bears testimony to the fact that the Honker has not changed his ways: "CANADA GOOSE'S POWER DIVE KNOCKS MAN FROM SADDLE. A resident of York county suffered injuries to his ribs yesterday when he was thrown from his horse as a heavy Canada Goose swooped down 100 feet and struck him. He was attended by a Toronto physician. For some years, it appears, Canada Geese have been regular visitors to the ponds on this man's property . . . the horse he was riding accidentally stepped on and destroyed a nest. Two geese made the power dive described, and although the rider ducked low over the horse's neck, the force of the blow when

one of the birds struck him was sufficient to knock him from the saddle. And the impact killed the goose" (The *Evening Telegram*, Toronto, May 10, 1941).

Both parents are assiduous in the care of their young. When swimming on the open water, the gander usually leads the flock, the goslings follow and the goose brings up the rear. The parents are ready at a moment's notice to protect their brood from natural enemies which beset them, and are ever on the alert to guard their young from turtle, pike, gull or eagle, willingly giving their lives to protect them or each other from any attack. During July and the beginning of August, while the young are attaining their growth, the adults lose their primary feathers and are unable to fly. While this moult is in progress they remain closely hidden in the weeds or bulrushes. About the middle of August the old birds as well as the young are capable of flight, and by the beginning of September they are strong on the wing and ready to undertake the voyage to their winter grounds.

The food of these geese is largely vegetable and in inland regions is mainly secured by grazing in the stubble of the prairie grainfields, where in the autumn they pick up the fallen grain, and in pastures, where they nibble at the green herbage. In spring migrating flocks may do considerable damage to young crops of wheat, barley, corn, and oats. They are very regular in their feeding habits and if not disturbed will return day after day to the same grounds. Favourite times of day for feeding are early morning and just before sunset; during the middle of the day they resort to open water, sandbars, or mud flats. In the marshes they feed on wild rice, sedges, and various other aquatic plants, insects, larvae, crustaceans, and small molluscs; they feed as do the Surface-feeding Ducks, tipping up with their tails and feet in the air and reaching down to the bottom of the shallows with their long necks. When on the same feeding grounds with other species they never seek their company and never permit others to mingle with their flocks.

The following interesting notes on the feeding habits of the Canada Goose were sent the author by Arthur S. Hawkins:

"Of the various waterfowl species, none is more terrestrial than the Canada Goose. Some flocks spend considerably more time on land than in the water. The large Honker flock that winters near Cairo, Illinois, roosts on Horseshoe Lake at night but spends the day feeding or resting in grain fields or on the sand bars of the Mississippi River where grit is available. A flock wintering near Walworth, Wisconsin, appeared content to spend both night and day on land. Drinking water and grit were furnished by Turtle Creek, a small stream that flowed swiftly enough in places and remained unfrozen. I have often observed geese at Horseshoe Lake Refuge walk more than a quarter of a mile when they could have covered this distance by flying much more quickly and easily.



"Compared to most birds, the goose is not an early riser. At Horse-shoe Lake they seldom left their night roost until after sun-up. On cold mornings the sun was often an hour high before the geese left for their feeding grounds. Once on the feeding grounds they seemed in no great hurry to start feeding. The most active feeding period of the morning was between 10:00 a.m. and noon.

"Their method of feeding is unique. Leaving the night roost they arrive at the feeding ground singly, in pairs, or in groups from 3 to 20



in size. Singles, pairs, and groups of from 3 to 7 are most commonly seen.

There is reason to believe that these are family groups. Singles may either represent nonfeeders or the surviving bird of a pair or family. Pairs may indicate adults which have lost their families. Large groups may be

combinations of families, or, according to several raisers of wild geese to whom I have talked, more than one generation of a given family.

"Two types of feeding were noted (1) the 'vacuum cleaner' type, (2) the desultory type. The first type was especially noticeable when shelled corn or wheat was spread out in a long narrow line. The geese, usually after dozing and resting for a while at some distance from the food supply, suddenly all decided to feed at once. Without further delay they would approach the end of the feed line and close in on it from all directions in a very business-like manner. Invariably they soon became packed together in an unbelievable small space, although it would have been just as convenient for them to have spread out comfortably along the feed line. Once on a feed line, the Honkers systematically mopped up the feed like a vacuum cleaner, removing every kernel as they went. If they became suspicious of some object near the center of the feed line, they always made a wide circle and attacked the line at its opposite end. While feeding they gave a humming noise that could be heard at a considerable distance.

"The desultory type of feeding was a family group affair rather than a community banquet. While the juveniles (?) fed leisurely the adults stood watch. From a blind I watched one group of seven birds feed in this manner for over an hour. At no time were the birds more than 25 yards from me. All that time one of the birds, probably an old gander, kept constant watch. Most of the time another bird also kept watch. Meanwhile, the other members of the group fed leisurely, never once taking a turn at watching. If the sentinels were the parents and the feeders their offspring, parental care in the goose must continue at least until mid-February, when I made this observation."

The Common Canada Goose is one of the earliest water birds to migrate in the spring. "The first signs of approaching spring come early in the far south, with the lengthening of the days and the increasing warmth of the sun; the wild geese are the first to appreciate these

signs and the first to feel the restless impulse to be gone; they congregate in flocks and show their uneasiness by their constant gabbling and honking, as if talking over plans for their journey, with much preening and oiling of feathers in the way of preparation; at length a flock or two may be seen mounting into the air and starting off northward, headed by the older and stronger birds, the veterans of many a similar trip; flock after flock joins the procession, until the last have gone, leaving their winter homes deserted and still" (Bent, 1925). Those that have wintered farthest south are the first to start on the journey and often by the last week in February are on their way. March, however, is the month of greatest movement.

Before the beginning of September the flocks once more become restless and start gathering in large numbers along the coasts and on the larger bodies of water preparatory to the journey south. While many flocks may be seen in September, the period when they move in greatest numbers is through October and the first half of November. They winter in southern Nova Scotia, British Columbia, and along both coasts of the United States, being particularly abundant in the coastal regions of North Carolina where extensive shallow sounds and smaller bodies of water, fresh and salt, provide excellent feeding-grounds. They also winter inland as far north as they can find suitable food and large bodies of open water.

Western Canada Goose

(White-cheeked Goose. A. O. U., 1931)

Branta canadensis occidentalis
(brán-ta, kan-adén-sis, ok-si-den-tál-is)

Colour Plate No. 2. Downy Young No. 32.)

(A subspecies of the Canada Goose)

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos*, being the Aristotelian name of an unknown bird. *canadensis*, Latinized form, meaning of Canada. *occidentalis*, Latin, meaning western.

COLLOQUIAL NAMES

IN LOCAL USE: Brant (and possibly some of the names applied to the Common Canada Goose).

DESCRIPTION

ADULTS, BOTH SEXES. (A western subspecies.) Of the same dimensions and general plumage pattern as the Common Canada Goose, but is somewhat darker on upperparts and has very dark, mouse-colored underparts. It is more frequently found with white collar near base of "stocking" than is the Common Canada Goose, which, however, occasionally has this marking; white cheekpatches generally divided, or partially so, under throat by black of neck; this feature only occasional with Common Canada Goose. In some birds cheekpatch brownish, barred with dusky.

JUVENILE. Moults and plumages similar to those of Common Canada Goose.

SPECIMEN IDENTIFICATION

See Common Canada Goose.

FIELD MARKS

Same as for Common Canada Goose.

LIFE STORY

This large, dark-coloured variety of the Canada Goose group occupies a decidedly local habitat from Vancouver Island, in British Columbia, north to Prince William Sound, in Alaska. It is practically non-migratory and does not wander far inland at any season. The damp climate of the west coast has a tendency to develop heavy, dark, saturated colours in many of its birds. This goose and the Cackling Goose are good examples of this phenomenon.

Although this goose is common, even abundant, in some parts of its restricted range, very little is known of its nesting habits. Dixon (1908) relates: "The country about Canoe Passage on Hawkins Island was low and rolling, with large open parks bordered by wooded creeks. There were a number of lagoons almost shut off from the bay by long grassy gravel bars. One mountain in the interior of the island was 1,900 feet above the sea, according to the aneroid." Dixon found Western Canada geese nesting near these lagoons, and about the 20th of June, goslings, which all seemed to hatch at about the same time, were everywhere. He found one nest which was placed in the open close to the trunk of a large tree just at the edge of the wood. It was lined with moss and down and held 6 eggs, which were almost ready to hatch. The same writer is quoted by Grinnell (1910) as follows: "In crossing some marshy flats we came upon six geese, five of which flew noisily away; but the sixth came gabbling toward us. We soon saw that her unusual tameness was due to her anxiety in regard to six or eight newly-hatched goslings that



scrambled from under our feet and disappeared with a splash into a nearby pond. I walked up to within 25 feet of the mother as she came with her head down in the usual manner of an irate goose. She followed us for some distance when we left." The eggs of this goose are practically indistinguishable from those of the Common Canada Goose, averaging 3.41 by 2.28 inches, as determined from one set of five eggs in the United States National Museum. The downy young and those of the Cackling Goose resemble each other very closely but are quite different from those of the other varieties of this species.

Of the nesting and feeding habits of this goose, G. Willett, Curator of Ornithology, Los Angeles County Museum, in a letter to the author says: "I have heard of several instances of this goose nesting on top of stumps in the woods. I had a photograph of one such nest, but it was too poor to publish. It was about 30 feet up on top of an old snag. The young of this bird are hatched near the beach, then are taken up the mountains where they feed largely on berries (moss-berries, huckle-berries). When the young return to salt water, they are nearly full-grown and can fly well. At this time their intestines are colored purple from their berry diet."

Of the winter habits Swarth (1923) says: "Since so many of the water birds of the coast of southern Alaska and British Columbia are resident the year through in that general region, it is very probable that the white-cheeked goose [Western Canada Goose] belongs in the same category. In a letter recently received from Mr. Allen E. Hasselborg, a resident of Juneau, Alaska, and familiar with the native birds and mammals, he confirms this view, saying that the geese are about as abundant in the Sitkan district in winter as in summer. During the winter they frequent the more sheltered south and west-facing bays and inlets, avoiding localities exposed to the cold land winds, while in summer they are of more general distribution. That this subspecies does not perform as extensive migrations as other members of the group is evident from its nonoccurrence in California. If it occurs in this State at all it should be found along the extreme northern coast."

Apart from being non-migratory, the habits and behaviour of the Western Canada Goose seem to be identical with those of the Common Canada Goose.

Lesser Canada Goose

Branta canadensis leucopareia

(brán-ta, kan-a-dén-sis, lu-ko-pa-ré-a)

Colour Plate No. 2. Downy Young No. 32.

(A Subspecies of the Canada Goose)

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos*, being the Aristotelian name of an unknown bird. *canadensis*, Latinized form, meaning of Canada. *leucopareia*, from Greek, *leukos*, meaning white, and *pareia*, meaning cheek.

COLLOQUIAL NAMES

IN GENERAL USE: Brant; little honker. IN LOCAL USE: Bernache; bisk-a-sish (a Cree Indian name, said to be properly spelled apistiskeesh); black brant; blackleg; California goose; China goose; crybaby; eastern brant; Eskimo goose; flight goose; goose brant; grey mud goose; prairie goose; short-necked goose; southern goose.

DESCRIPTION

ADULTS, BOTH SEXES. (Abundant variety of the midwest.) Smaller than Common Canada Goose and Western Canada Goose, but larger than Richardson's and Cackling Goose. General pattern and coloration same as in the Common Canada Goose, except that the "stocking" may be somewhat shorter proportionately.

JUVENILE. Moults and plumages similar to those of Common Canada Goose.

SPECIMEN IDENTIFICATION

See Common Canada Goose.

FIELD MARKS

Same as for Common Canada Goose.

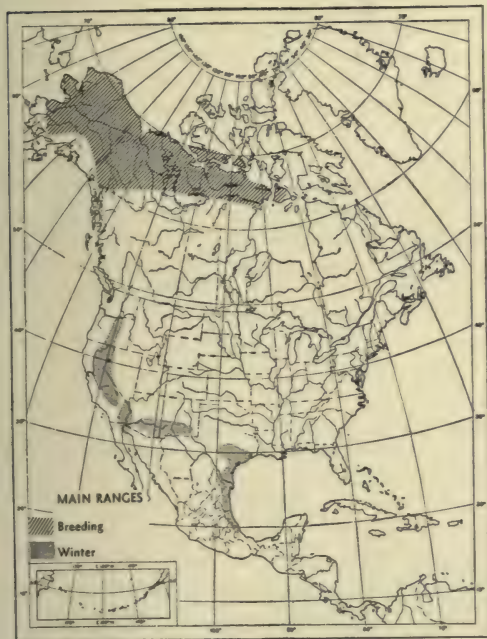
VOICE. The same as the Common Canada Goose but higher pitched, sharper and noticeably less sonorous. The voice is an excellent, and often the best, field mark.

LIFE STORY

The Lesser Canada Goose is the goose which up to 1931 has masqueraded as "Hutchins's Goose." It must be remembered that in all literature prior to that date, whenever Hutchins's Goose is referred to, the Lesser Canada Goose is the one to which the remarks are applicable. All those who have known this bird as "Hutchins's" should accustom themselves to calling it by its new and correct name.

The facts leading up to this change of name are as follows: In 1831 Sir John Richardson discovered a very small goose in the Hudson Bay, which he named Hutchins's Goose, *hutchinsi*, for Mr. Hutchins of the Hudson's Bay Company. In the course of years this little goose was either forgotten or overlooked by naturalists and its name was erroneously applied to the present bird. When, a few years ago, the original little Hutchins's Goose was rediscovered and the facts of the case became known, its name was bestowed upon it in the 1931 Edition of the A.O.U. Check List, and the present bird, which for the moment had no name, was then called the Lesser Canada Goose.

The Lesser Canada Goose is proportionately shorter of neck than are the other varieties of Canadian Geese, and is often referred to as the "short-necked goose." It is the most abundant member of its tribe in the west, where it has afforded grand sport for the gunner and where its excellent table properties have made it a most popular game bird. Its



flesh, however, is not considered to be quite the equal of that of the Common Canada Goose, and of course it is not such a large bird and therefore not as desirable.

Its breeding grounds lie along the extreme northern Arctic coasts and, as if knowing that in these regions the ice is late in breaking up on the shores and in the bays of its summer home, it is a comparatively late migrant in the spring. Its nest is built on the ground in a hollow in the tundra, lined with moss, grass, leaves, rubbish, and with down from the mother's breast. The usual clutch is from 4 to 6 eggs, and the average size of an egg is 3.12 by 2.09 inches. The eggs are similar to those of the Common Canada Goose.

In the interior valley of California where these geese winter in incredible numbers in association with the White-fronts, Lesser Snows, Ross's and Cackling Geese, they feed mostly in the grain fields and grassy plains. Formerly, when they were much more abundant, they did considerable harm to the sprouting grain and it was customary for farmers to hire men and furnish them with guns and ammunition, to drive them off.

The habits and behaviour of this goose are identical with those of the Common Canada Goose, and have been dealt with at length in the "Life Story" of that variety.

Richardson's Goose

(Hutchins's Goose. A. O. U., 1931)

Branta canadensis Hutchinsi
(brán-ta, kan-a-dén-sis, húch-in-si)

Colour Plate No. 2. Downy Young No. 32.

(A subspecies of the Canada Goose)

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos*, being the Aristotelian name of an unknown bird. *canadensis*, Latinized form, meaning of Canada. *hutchinsi*, after

Thomas Hutchins, an official of the Hudson's Bay Co., who, about 1785, spent some time at Forts Albany and Severn, and described many of the birds found there.

COLLOQUIAL NAMES

None.

DESCRIPTION

ADULTS, BOTH SEXES, (An eastern subspecies.) General pattern coloration same as in the Common Canada Goose and Lesser Canada Goose. Smaller bird than Lesser Canada Goose but somewhat larger than the dark-coloured, little Cackling Goose of the West.

JUVENILE. Moults and plumages similar to those of Common Canada Goose.

SPECIMEN IDENTIFICATION

See Common Canada Goose.

FIELD MARKS

The same as for Common Canada Goose, in miniature.

VOICE. Taverner (1931) quotes Manley Miner as saying, "It does not honk but cackles or clucks like an old hen scolding," and "their noise is *k-r-r-r-r* like an old hen telling her chicks to look out for a hawk or calling her young to feed—*k-r-r-r-r*, a sort of trill."

LIFE STORY

The little Richardson's Goose was first described by Sir John Richardson in 1831, from a bird which was killed on June 19, 1822, on Melville Peninsula north of Hudson Bay. The original bird, a male, is now in the Edinburgh Museum. Richardson named this bird Hutchins's Goose, *hutchinsi*, after Mr. Hutchins of the Hudson's Bay Company.

In the course of years Richardson's goose seems to have been overlooked and its name *hutchinsi* has, for a long time, been erroneously applied to the goose now known as the Lesser Canada Goose.

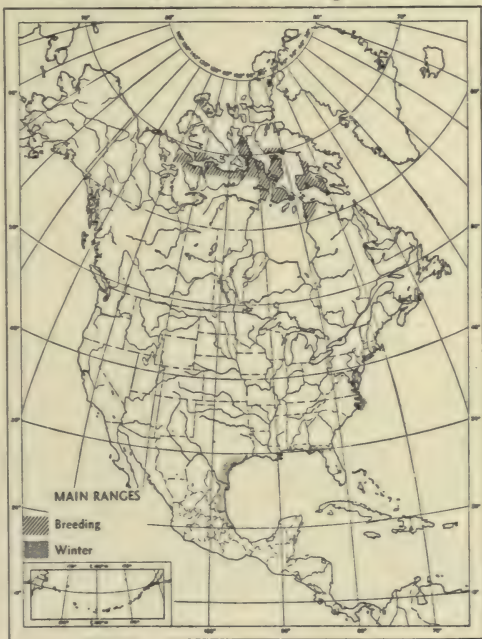
In 1926, however, Soper (1928) found these little geese nesting in southern Baffin Island, southeast of the Melville Peninsula, where the subspecies was originally discovered. This constituted a re-discovery of the race. Again in 1929 Soper found them nesting commonly on the Foxe Basin coast of southwestern Baffin Island. Upon these facts becoming known, the name *hutchinsi*, which meanwhile had been applied to another goose, was re-bestowed upon its rightful owner, the little Richardson's Goose.

The range of this variety of the Canada Goose group is now clearly established; Taverner (1931) says: "Breeding in the eastern Arctic, it migrates down Hudson Bay and through southern Manitoba, Nebraska, Iowa, the Dakotas, and the Mississippi valley, wintering on the northern gulf coast of Mexico."

In his account of the birds of Southampton Island, Sutton (1932), says that Richardson's Goose "is a common, locally abundant, summer resident all along the southern coast of Southampton Island, wherever there are little lakes with small islands, upon which it may nest. As a migrant it is sometimes so common, that I am led to believe that birds which nest on Melville Peninsula and even on Baffin Island may occasionally pass over or stop for a time at Southampton. It arrives a little later in the spring than the Lesser Canada Goose, the Lesser Snow Goose, and the Blue Goose, but considerably in advance of the Brant. In the fall its migrant flocks are composed of from one to three family-groups, which travel southward together. It has never been known to winter in the region. . . .

"On June 8 several small bands, some pairs of which appeared to be mated, and a few single birds were seen flying toward the head of the bay. They gave forth a high-pitched, honking outcry. On June 10 I watched several birds, which appeared to be courting. They were frequenting the snowless patches of ground, where they dignifiedly walked about, craning their necks this way and that, bowing and cronking in their high falsetto voices. On June 11 several small flocks were seen. By this time the birds all seemed to be mated, but they went about in companies of six or eight. In the early morning we usually heard them north of the Post. At about 10 o'clock they rose with a good deal of clamor to make their way to the head of the bay, where they fed, rested for a time, then returned. . . .

"On June 16, early in the morning, I found a nest containing two eggs on a small, grassy island, about forty yards from the shore of a rather large lake two miles inland from the frozen bay. There was much ice in this lake, and I was able to make my way out to the island by leaping from chunk to chunk. The eggs were uncovered. When I returned early in the afternoon I found the female on the nest, and the male standing nearby, his head held downward as if he were trying to hide. As I drew nearer, he snaked his way slowly to the water's edge,



slipped quietly in, and swam off rapidly, honking loudly. When within about forty feet of the nest, and still trying to make my way along the irregular and treacherous ice-chunks, I noted that the tone of the male changed a little and suddenly the female sprang from the nest and flew to her mate. In the nest were now three eggs. The nest was a broad cup, about five inches deep, which appeared to me to have been in use for several seasons. It was situated almost in the center of the island, and was not sheltered in the slightest by any stone or vegetation. . . . On returning to this nest the following day, I found no male standing guard. After wading out through water waist-deep (the ice had now broken up) I found that herring gulls had eaten the eggs and strewn the down of the nest all over the islet. I am inclined to think that the gulls robbed the nest shortly after I frightened the geese away. . . .

"On June 18 at the head of South Bay we found fifty-seven nests, all on islands in shallow lakes. Many of these were so close together as to suggest a sort of colony. In one small lake there were three nests, one on each of the only islands available. In several lakes there were two islands, each with a nest; but nowhere did we see two nests on one island. . . .

"The first young birds were seen on July 14. On this date I found one nest with only two eggs, one of which was just hatching, and several newly-hatched broods of five and six young with their parents. The old birds were frantic when I bore down upon their broods; they flopped about in the water, simulated diving, honked loudly, and trailed off, as if wounded. Sometimes they came up to within a few feet of me and lay gasping as if at the point of death. The young, which kept up a feeble cheeping, swam well, but dived poorly. When first frightened they all disappeared under water. When they came up a second or two later they were short of breath; and the next time they tried to dive they could not get under, but stuck their heads down and paddled along as best they could, their big feet kicking out comically. When I walked away from one of the broods, the male bird escorted me, half running and half flying. Sometimes he lay on his side and simulated a crippled condition; then again he rose and flew along with his legs trailing. He led me thus fully half a mile. . . .

"The eggs, which number from two to six, are laid daily, after the set is begun. The first eggs are usually laid about June 15. If we may infer that most of the nests hold full, fresh sets by June 19, and that in most cases the young hatch about July 15, the period of incubation must be about 27 or 28 days. . . . [The eggs are dull white in colour, are similar to those of the Common Canada Goose, and average 3.14 by 2.04 inches, determined by one set of eggs in the Carnegie Museum.]

"The principal enemy of this little goose is probably the Eskimo, who kills the adult birds for food and gathers the eggs all through the summer, taking them all whether 'good' or 'bad.' The herring gull destroys a good many eggs, too, as do also the jaegers to a lesser extent. The Arctic fox does not get many eggs, because the nests are built on islands."

Cackling Goose

Branta canadensis minima
(brán-ta, kan-a-dé-sis, mín-i-ma)

Colour Plate No. 2. Downy Young No. 32.

(A subspecies of the Canada Goose)

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos*, being the Aristotelian name of an unknown bird. *canadensis*, Latinized form, meaning of Canada. *minima*, Latin, meaning smallest, least.

COLLOQUIAL NAMES

IN GENERAL USE: Brant. IN LOCAL USE: Brown brant; bullneck; bullneck goose; cackler; chornie goose; crow goose; greaser; little grey goose; little squeaking goose; yelper.

DESCRIPTION

ADULTS, BOTH SEXES. (A western suspecies.) Very small, about size of Mallard, somewhat smaller than Richardson's Goose. Markings and pattern similar to Common Canada Goose but coloration much darker, same as Western Canada Goose, the other western variety of this species. Differs in markings from others of the species in that feathers of upper chest at base of black "stocking" are darker than rest of chest, causing black of neck to merge into colour of lower neck instead of being sharply demarked as in the other varieties of this species. White cheek patches frequently divided by black of throat; this subspecies is often found with white collar at base of black "stocking."

JUVENILE. Moults and plumages similar to those of Common Canada Goose.

SPECIMEN IDENTIFICATION

See Common Canada Goose.

FIELD MARKS

Same as for Common Canada Goose, of which it is a dark miniature.

VOICE. A loquacious bird, uttering a frequently-repeated *luk-luk, luk-luk*, even more high-pitched in tone than the voice of the Lesser Canada Goose.

LIFE STORY

The tiny Cackling Goose, like the Western Canada Goose, is a dark-coloured variety of the Canada Goose species. These two birds are exclusively western in their range, and, like so many of the birds of the damp west coast, have developed a heavy, dark, saturated plumage-coloration. The Cackling Goose is somewhat smaller than the other small, eastern variety of this species, Richardson's Goose. It derives its name from its oft-repeated high-pitched call, *luk-luk, luk-luk*, which is so distinctive that it affords one of the best field marks for this bird.

The following interesting account of the arrival of Cackling Geese on their breeding grounds in Alaska is given by Nelson (1887): "As

May advances and one by one the ponds open, and the earth looks out here and there from under its winter covering, the loud notes of the various wild fowl are heard, becoming daily more numerous. Their harsh and varied cries make sweet music to the ears of all who have just passed the winter's silence and dull monotony, and in spite of the lowering skies and occasional snow squalls everyone makes ready and is off to the marshes.

"The flocks come cleaving their way from afar, and as they draw near their summer homes, raise a chorus of loud notes in a high-pitched tone like the syllable "luk," rapidly repeated, and a reply rises upon all sides, until the whole marsh reechoes with the din, and the newcomers circle slowly up to the edge of a pond amid a perfect chorus raised by the geese all about, as in congratulation.

"Even upon first arrival many of the birds appear to me mated, as I have frequently shot one from a flock and seen a single bird leave its companions at once and come circling about, uttering loud call notes. If the fallen bird is only wounded, its mate will almost invariably join it, and frequently allow itself to be approached and shot without attempting to escape. In some instances I have known a bird thus bereaved of its partner to remain in the vicinity for two or three days, calling and circling about. Although many are mated, others are not, and the less fortunate males fight hard and long for possession of females . . . They would seize one another by the bill, and then turn and twist each other about, their wings hanging loosely by their sides meanwhile. Suddenly they would close up and each would belabour his rival with the bend of the wing, until the sound could be heard two or three hundred yards. The wing-strokes were always warded off by the other bird's wing, so but little damage was done; but it usually ended in the weaker bird breaking loose and running away. Just before the males seize each other they usually utter a series of peculiar low growling or grunting notes."

In Alaska, the last week of May finds many of these birds already depositing their eggs. Upon the grassy borders of ponds, in the midst of a bunch of grass, or on a small knoll they find a spot where they make a slight depression and perhaps line it with a scanty layer of grasses, after which the eggs are laid. The usual clutch is from 4 to 7 eggs, the average size of which is 2.86 by 1.89 inches. The eggs are similar to those of the Common Canada Goose. When they are about to hatch, or the young are out, both parents frequently become perfectly reckless in the face of danger. The downy young of this bird and those of the Western Canada Goose are practically indistinguishable, but are quite different from those of the other varieties of the same species. As an example of parental solicitude, Turner (1881) relates that once during a heavy fall of snow, which covered the ground to a depth of three feet, the nesting birds did not leave their nests, and were later found in scores by the natives, dead on their nests, having suffocated rather than desert their homes.

This little goose has always been much hunted. Bent (1925) says: "The primitive hunters of the Aleutian Islands formerly killed large numbers of these geese by catching them in long nets set on the edges of ponds where they fed. Some of the natives were also quite expert at throwing at the passing flocks a bolas made of three stones attached to a leather thong, which became entangled with the necks and wings of the birds, bringing sometimes two and even three birds down to the ground. The birds were salted away for future use during the winter and must have served as an important addition to the food supply of the natives." Grinnell, Bryant, and Storer (1918) say: "Very large numbers of Cackling Geese are to be found at times in the markets of our larger cities." Once just as numerous as the Lesser Canada Goose, if not more so, it is rapidly decreasing in numbers from year to year.



"Old residents in some parts of the Sacramento Valley say that now there is not more than one of these geese present where formerly there were hundreds. To the work of the market hunter can be attributed much of this decrease, for this goose is one which is easily procured and which finds a ready sale on the market. While still rated as common in restricted portions of the State [California], this goose is in a fair way to disappear completely unless enough of the birds are left each winter to guarantee the return of an adequate stock in the spring to the breeding grounds in the north."

The prohibition of market hunting and the enforcement of the more enlightened game laws of today have greatly benefited this little goose, and once again in winter Cackling Geese are abundant in the interior valleys of California, where they frequent the grain fields in company with Lesser Canada Geese, Snows, Ross's, and White-fronts. The habits and behaviour of the Cackling Goose are so similar to those of the Common Canada Goose that they need not be repeated here.

American Brant

Branta bernicla hrota

(brán-ta, bér-ni-kla, hró-ta)

Colour Plate No. 3. Downy Young No. 32.

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos* or *brinthos*, being the Aristotelian name of an unknown bird; *bernicla*, Latinized form of the English word "barnacle"; *hrota*, the Icelandic word for the Brant.

COLLOQUIAL NAMES

IN GENERAL USE: Brant. IN LOCAL USE: Black brant; brant goose; lightbellied brant.

DESCRIPTION

ADULTS, BOTH SEXES. *Head and neck*, leaden black, except for broken white crescent on each side of neck; *bill*, black; *eye*, brown. *Body. Chest and foreback*, leaden black, sharply defined against breast and sides; *back and scapulars*, brown, with feathers vaguely tipped with lighter brown; *rump*, dusky brown to dusky, with sides of rump white; *forebreast and sides*, pale ashy grey, feathers of latter slightly browner, and broadly tipped with white; *breast, belly and flanks*, pale greyish to light greyish brown; *feet*, black. *Tail*, black, the long upper and under *coverts*, white, these often as long as, or slightly longer than tail. *Wings*. All *coverts*, grey brown, with paler edges to feathers, broader on middle and greater *coverts*, edgings usually less conspicuous than on back and scapulars; all *flight-feathers*, dusky black; *lining and axillars*, grey brown.

JUVENILE. In first autumn, similar generally to adults except that white feathers on *neck* are hardly discernible; *back, scapulars* and *wing-coverts*, except forward lesser *coverts*, edged with buffy white, there being considerable variation in broadness of edgings on *wing-coverts*; *breast* more uniform grey with darker shafts; *tail-feathers*, usually tipped with whitish. A continuous moult during winter and spring tends toward maturity of plumage and, after complete moult during summer, plumage is fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A small, greyish-brown goose with black head, neck and foreparts, and a light breast; slightly larger than a Mallard. Chief distinguishing features (a) white collar incomplete before and behind, (b) black of chest sharply defined against lighter colour of breast and sides, (c) greyish-white breast.

Very similar to the Black Brant but separated by its light breast as well as by features (a) and (b). Distinguished from the Barnacle Goose by the white head of that species.

JUVENILES. Closely resemble adult, the best distinguishing plumage character being the *wing-coverts* (see Plate No. 3). Similar to juvenile Black Brant but distinguished by its lighter-coloured breast and sides. See "Descriptions."

FIELD MARKS

(A maritime species of the Atlantic coast.)

ON THE WATER. A very small, dark-appearing goose with a short, black neck and whitish sides; not much larger than a Mallard. It sits as lightly on the water as a gull, with tail upraised, showing the white under tail-coverts. The head is poised gracefully, and the bird pivots frequently as it feeds, demonstrating great beauty of move-



ment. The Black Brant of the Pacific coast is similar, but on the water the sides do not show quite as much white (this is probably a poor field mark in most cases).

IN FLIGHT. The short, black neck and foreparts contrast sharply with the white breast; the white V over the tail formed by the upper tail-coverts is very noticeable, and the wings appear long and pointed. The breast is much lighter than that of the Black Brant. The flight is in long, undulating, curving lines or in irregular formation.

VOICE. Guttural, *car-r-rup*, and *r-r-r-rouk*, and *r-r-rup*, and *ruk-ruk*, a loud metallis *chronk, chronk*, a double note *torock* and an alarm cry, *wauk*, also a confused babbling audible at a great distance.

LIFE STORY

The American Brant, or white-bellied brant, is a true sea goose, being seldom encountered away from salt water. It is an Atlantic coast bird, an American variety of the Brant or Brent Goose of Europe. Rarely is it found on the Pacific coast where the Black Brant, which differs from it mainly by being darker on the underparts, replaces it. Both birds are small, short-necked, long-winged geese, about the size of a Mallard duck. There is evidence that the two species may interbreed, as many intermediate specimens are recorded, and their Arctic breeding ranges meet or overlap. Of their appearance, Allan Brooks (1934) says: "No other ducks or geese can compare with brant in sheer beauty of movement. On the water they sit as lightly as gulls, the tail upraised and the neat little head poised on the graceful neck. Seeking their food, they pick daintily at the water and pivot swiftly to do so. On the wing they are at their best."

On their breeding grounds in the far north these geese are often found nesting along with Eider Ducks. The nests are substantially built of mosses, lichens, and other vegetable matter, with a plentiful lining of light greyish down. On shingle banks, where little nesting material is available, the nest may be nothing more than a hollow among the stones, lined with down and perhaps a few bits of seaweed or lichen. The number of eggs varies from 3 to 8, but usually 3 to 5 comprise the set. The

eggs are creamy white in colour and average 2.82 by 1.85 inches. The period of incubation is probably about four weeks, and, though incubation is performed by the female alone, she is not deserted by the male. As is the usual habit among geese, the gander assists in the raising of the family. Ekblaw, quoted by Bent (1925) says: "As soon as the young are hatched they hurry to sea. They dive and swim agilely almost as soon as they reach the water. Several broods of young are wont to congregate together, the mothers aiding one another in vigilant guidance and guard over the flock. They are exceedingly shy, and it is well-nigh impossible to approach them except by surprise. They grow and develop fast, so that by mid-September they are ready for their departure. As soon as the ice begins to form in the fjords the brants begin to leave. By October 1 the last long, low-flying files of migrating brant have passed the outer capes; almost nine months slip by before they appear again."

Of the American Brant, Bent (1925) says: "Brant do not ordinarily fly in V-shaped flocks, like Canada Geese, but in long undulating lines, spread out laterally in straight company-front formation, or in a curving line, or in an irregular bunch, and without a definite leader. When migrating overland they fly high, but when travelling along the coast they usually fly within a few feet of the water. Their flight is apparently slow and heavy, but it is really swifter than it seems. A flock of oncoming brant is a thrilling sight to the expectant gunner; he can recognize afar the long wavy line of heavy black birds; as they draw near, the white hind parts show up in marked contrast to the black heads and necks; and soon he can hear their gabbling, grunting notes of greeting to his well-placed decoys. They are naturally shy birds, and we seldom got a shot at the passing flocks when anchored off the shore in small boats. But on their feeding grounds they are more fearless and will decoy well to live or even wooden decoys around a well-concealed blind. Brant can swim well, but do not dive unless hard-pressed. They prefer to skulk and hide by stretching the neck out on the water or in the grass. They are very fond of sand and like to rest on sandy points and sand bars

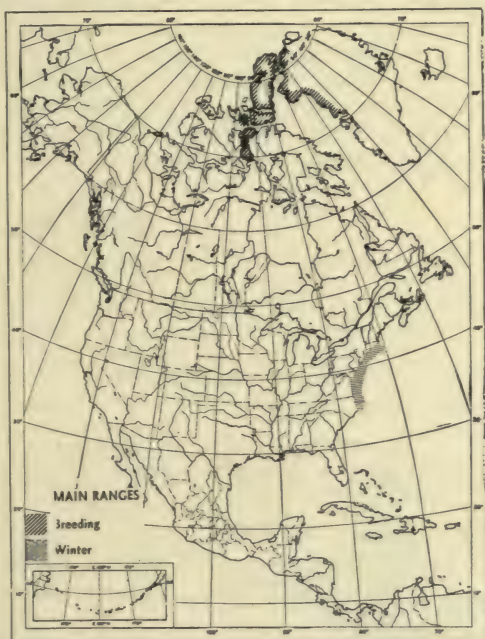
"From the standpoint of the epicure the Brant is one of our finest game birds, in my opinion the finest, not even excepting the far-famed Canvas-back. I cannot think of any more delicious bird than a fat, young Brant, roasted just right and served hot, with a bottle of good Burgundy Real brant shooting may be had at only a few favored localities where the birds are wont to congregate, and then only with an elaborate equipment. It was a sorry day for the brant shooter when spring shooting was abolished, for the Brant is the one bird above all others for which spring seems to be the natural shooting season. Brant seem to be more plentiful in the spring than in the fall and to linger longer on their favorite feeding grounds at that season

"On Monomoy our brant shooting is done from boxes located on favorable points or sandbars near the feeding grounds Live decoys

are preferable, but Brant will come to good wooden decoys if properly placed; a supply of both is desirable. The Brant feed at low tide away off on the eelgrass beds; but as the rising tide covers the grass too deeply, they are driven to seek other feeding grounds or sanding places, and in flying about will often come to the decoys. The best shooting then is for a short time only, at about half-flood tide and again at about half ebb, while the birds are moving. The morning tides are considered the best, so it is often quite dark when we tramp down through the marsh to our box, heavily laden with decoys, guns, and ammunition and encumbered with rubber boots and oilskins, for it is cold and wet work."

On their Arctic breeding grounds the food of these birds consist of grass, algae, moss, and stalks and leaves of Arctic plants. In the winter on our Atlantic coast their chief food is eelgrass (*Zostera marina*), which grows so extensively in shallow bays and estuaries. They do not graze on dry land like so many of the other geese, but the ebbing tide finds them in large flocks over the beds of eelgrass, which they attack as soon as the water becomes sufficiently shallow; nor do they dive for their food, but feed as do the Surface-feeding Ducks by "tipping" in the shallow waters, their rumps and white tail-coverts being the only visible parts. They prefer the roots and lower white portions of the eelgrass but eat the green fronds as well; they pull up much more of the plant than they require for the immediate meal, and eat the floating remainder later, when the tide has risen and the roots are no longer available. They have a peculiar habit of so rolling up their food that it appears as neat, compact little balls in their stomachs and they pack away enormous quantities of grass in this manner. The unprecedented and nearly complete destruction of eelgrass on the coasts of the North Atlantic that began about 1931 and has continued with small abatement to the present has been disastrous for the Brant, for this plant was their chief item of diet south of the Labrador Peninsula.

In February the Brant which have spent the winter farthest south



begin to move northward, joining the birds which have wintered in more northerly places. The main flight is probably in March, and by April, except for some stragglers, the Brant have left their winter quarters. Winter comes early in the far North and the Brant are forced to start their migration south early in September or even in late August, and the main flight reaches the Gulf of St. Lawrence late in September. By the middle of October or early November these birds are once again on their winter grounds, the main part of which lies on the Atlantic coast from New Jersey south.

Black Brant

Branta nigricans

(*Branta bernicla nigricans*, of Peters)

(brán-ta, ní-g-ri-kans; bér-ni-kla)

Colour Plate No. 3. Downy Young No. 32.

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos* or *brinthos*, being the Aristotelian name of an unknown bird; *nigricans*, Latin, meaning blackish; *bernicla*, Latinized form of the English word "barnacle."

COLLOQUIAL NAMES

IN GENERAL USE: Brant. IN LOCAL USE: China goose; Eskimo goose; sea brant.

DESCRIPTION

ADULTS, BOTH SEXES. *Head* and *neck*, leaden black, except for white collar at top of neck, incomplete behind; *bill* black; *eye*, dark brown. *Body*. *Chest* and *foreback*, leaden black (sometimes blending into slaty breast); *back* and *scapulars*, brownish black, feathers slightly paler at tips; *rump*, brownish black, with sides of rump, white; *breast*, slaty brown, blending into black of chest; *sides*, slaty brown, barred with white or whitish; *belly* and *flanks*, whitish; *feet*, black. *Tail*, black; upper and under *coverts*, white, usually as long as, and sometimes slightly longer than, tail. *Wings*. All *coverts*, like back; all *flight-feathers*, dull black; *lining* and *axillars*, greyish brown.

JUVENILE. During first autumn, similar in general coloration to adult but more greyish; *scapulars*, *secondaries* and *wing-coverts*, brown, tipped with white, there being considerable variation in broadness of white tipping in coverts; white collar of adult not evident and no barring on sides; *breast*, dark grey to blackish. After complete moult during summer, plumage fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect. A small, brownish-black goose with black head, neck and foreparts, and dark breast; slightly larger than a Mallard. Chief distinguishing features (a) white collar incomplete behind, complete in front unlike that of the American Brant, (b) solid black of foreparts merging into dark breast, (c) breast, slaty brown.

Very similar to American Brant but separated by its dark breast as well as by features (a) and (b). Distinguished from Barnacle Goose by white head and breast of that species.

JUVENILES. Closely resemble adult, the best distinguishing plumage character being the wing-coverts (Plate No. 3). Immature birds are similar to immature American Brants, but are distinguished by the darker breast and sides. See "Descriptions."

FIELD MARKS

(A maritime species of the Pacific coast).



ON THE WATER. A very small, blackish-appearing goose with some white on the sides and flanks; slightly larger than a Mallard. It sits buoyantly on the water with head gracefully poised and tail uplifted, showing the white of the under tail-coverts, and exhibits great beauty of movement. Usually found in small companies. The white col-

lar is noticeable but not conspicuous unless close at hand. Very similar to American Brant of the Atlantic coast, and on the water shows almost as much white of sides and hindquarters.

IN FLIGHT. The entire body appears very dark, relieved by the white under tail-coverts and white V over the tail formed by white upper tailcoverts. The neck is short, and the wings long and pointed. These geese usually move in small flocks in single line, with frequent changes of elevation. The flight is fast, with short, energetic, rapid wing beats, and is usually close to the water.



VOICE. A low guttural, *gr-r-r-r-r*, *gr-r-r-r-r* uttered when in flight or at rest; a mellow *cronk*, *cronk*, *cronk*; a guttural *wah-ook*.

LIFE STORY

The Black Brant is a strictly maritime species of the Pacific coast. In appearance, behaviour, and food habits it closely resembles the American Brant of the Atlantic coast. It is abundant on the west coast of North America but on the eastern seaboard it is found as a straggler only; it is strange, therefore, that it was first described by George N. Lawrence (1846), from a specimen taken at Egg Harbour, New Jersey. (A parallel instance is that of the Cinnamon Teal, another strictly west-coast species, which was first recorded in 1849, in Louisiana.) This Brant breeds on the Arctic coasts of western America and eastern Siberia and migrates in the autumn down both coasts of the Pacific to California and Japan. On its winter grounds its favourite food is eelgrass (*Zostera Marina*), and when it is feeding on that plant its flesh is fit for the epicure.

The flight is very distinctive, and the following description is condensed from an account by Nelson (1881): The strokes of the wings are "short, energetic, and repeated with great rapidity, carrying the bird with a velocity far greater than that attained by any other goose with which I am acquainted The order of flight is invariably a single rank, the birds moving side by side in a line at right angles to their course so that the entire strength of a flock is to be seen at a glance along its front, which at times covers several hundred yards. There is barely room enough between the individuals to allow a free wing stroke The entire flock, consisting of perhaps over a hundred birds arranged in single line, is hurrying on, straight as an arrow, towards its destination, when, without warning, it suddenly makes a wide curving detour of several hundred yards, then resumes its original course only to frequently repeat the maneuver, but always with such unison that the closest scrutiny fails to reveal the least break or irregularity in the line

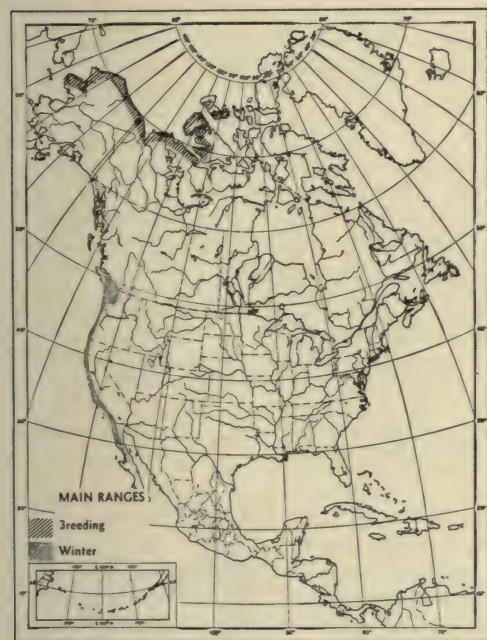
"In addition to this horizontal movement is a still more interesting vertical one which often occurs at the same time as the other but generally by itself. A bird at either end of the flock rises or descends a few inches or several feet, as the case may be, and the movement is instantly followed in succession by every one of its companions till the extreme bird is reached and the entire flock is on the new level These latter changes are made so regularly and with such rapidity that the distance between the birds does not appear altered in the least The Black Brant never wings its way far up in the sky, as many other geese have the habit of doing, but keeps, as a rule, between 10 and 30 yards above the ground, with more flocks below these limits than above them. Another idiosyncrasy of this bird is its marked distaste for passing over low ranges of hills which may cross its path So slight an obstacle as this is enough to cause at least 95 per cent of the flocks to turn abruptly from their path and pass along its base to round the end several miles beyond, and then continue their passage."

Describing how, after long months of winter inactivity, in northern Alaska, his party awaited the spring arrival of the Black Brant, the same writer says: ". . . . suddenly a harsh, *gr-r-r-r*, *gr-r-r-r*, *gr-r-r-r* causes us to spring up, but too late, for, gliding away to the northward, the first flock goes unscathed. After a few energetic remarks upon geese in general and this flock in particular, we resume our position, but keep on the alert to do honor to the next party. Soon, skimming along the horizon, flock after flock is seen as they rise and hurry by on either side. Fortune now favors us, and a large flock makes directly for the ambush, their complicated and graceful evolutions leading us to almost forget why we are lying here upon our face in the bog with our teeth rattling a devil's tattoo in the raw wind. On they come, only a few feet above the ground, until, when 20 or 30 yards away, we suddenly rise upon one knee and strike terror into the hearts of the unsuspecting victims. In place of the

admirable order before observed, all is confusion and, seemingly in hope of mutual protection, the frightened birds crowd into a mass over the center of the flock, uttering, the while, their ordinary note raised in alarm to a higher key. This is the sportsman's time, and a double discharge as they are nearly overhead will often bring down from 4 to 10 birds. Scarcely have the reports died away when they once more glide along close to the ground; the alarm is forgotten; order is again restored, and the usual note is heard as they swiftly disappear in the distance."

In Alaska the nest of this species is a depression in the moss or grass near the lakes out in the tundra. Bent (1925) says: "The nests

of this species are the most beautiful nests I have ever seen of any of the ducks and geese; they are great, soft, thick beds of pure, fluffy down, unmixed with the tundra rubbish so common in nests of other species; the down is a rich, handsome shade of . . . deep brownish drab, flecked with whitish; it must make a warm and luxurious blanket to cover the eggs." The Black Brant lays from 4 to 8 eggs, but 5 seems to be the commonest number; they are olive buff, or cream colour and average 2.80 by 1.87 inches. As is usual with geese, the male stands ready to guard the nest while the female is incubating. Hoare, quoted by Bent (1925), relates that one summer he witnessed a battle between a



male Black Brant and three gulls. The female was on the nest and did not move. The gulls kept returning to the attack and were very fierce. Usually they are cowardly. Eventually the Brant, although badly mauled, drove them away.

The main flight northward takes place in March and early April and the birds arrive on their breeding grounds early in June. In the autumn, migrating flocks pass through the Bering Sea during the last half of September and the first half of October to reach the coasts of California in October and November.

Barnacle Goose

Branta leucopsis
(brán-ta, lu-kóp-sis)

Colour Plate No. 3. Downy Young No. 32.

SCIENTIFIC NAME

Branta, a corruption of Greek *brenthos* or *brinthos*, being the Aristotelian name of an unknown bird; *leucopsis*, from Greek *leucos*, meaning white, and *opsis*, meaning appearance, referring to the white face. The vernacular name "Barnacle" refers to the ancient Norse belief that these geese were hatched from barnacles.

COLLOQUIAL NAMES

None in North America; in Great Britain it is known as bar goose, and clakis, and in France as bernache, or oie bernache (barnacle goose), and oie nonnette (nun goose).

DESCRIPTION

ADULTS, BOTH SEXES. *Head*, white, except for small black patch between eye and bill, and an extension of black, continuous from black *neck*, over *hind head* including *crown*; *bill*, black; *eye*, brown or hazel. *Body*. *Chest*, solidly black, sharply defined against white of *breast* and merging into blackish *back*; *scapulars*, blended with silvery grey and black; *rump*, black; *sides*, silvery grey, barred with white; *belly* and *flanks*, white; feathering of *legs*, black; *feet*, black. *Tail*, black; upper and under *coverts*, white. *Wings*. All *coverts*, silvery grey, basally, then with broad bar of brownish black, tipped narrowly with white, general effect a scaled design; *primaries*, silvery grey, becoming blackish towards tips and on inner webs; *lining* and *axillars*, silvery grey.

JUVENILE. Similar to adults, but dark area browner, and white of head speckled with dark feathers. Full adult plumage after first summer moult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A small goose, with white head, black neck and chest, greyish upper-parts and white breast. Chief distinguishing features (a) white head, with black crown and hind head, and small patch between eye and bill, (b) solidly black chest and neck.



Similar to American and Black Brants but separated from these by its white head, the heads of both of those species being solidly black. All the Canada Geese have white cheek-patches but lack the black chest of the Barnacle Goose.

JUVENILES. See "Description."

FIELD MARKS

(An European species, only on occasional maritime visitor to the Atlantic seaboard.)

ON THE WATER AND IN FLIGHT. Very much like the American Brant but the white face, throat, and forehead will identify it even at a considerable distance. In all habits and movements it is similar to the Brant. (See American Brant.)



LIFE STORY

The Barnacle Goose, an Old World species, is a fairly frequent visitor to our eastern seaboard, usually in the autumn. According to an ancient Norse belief, the first appearance of the Barnacle Goose was said to be in the form of a barnacle shell, adhering to old, water-soaked logs, trees or other pieces of wood taken from the sea. From this fable sprang the name of the bird. Of this goose-bearing tree, Gerard, in his "Herbal" published in 1597 gives the following account, *based on his personal experience*, of a shell-covered rotten tree which he dragged out of the sea between Dover and Romney, in England. In some of the adhering shells he found . . . "living things without forme or shape; in others, which were nearer come to ripeness, living things that were very naked, in shape like a birde; in others, the birds covered with soft downe, the shell half open, and the birde readie to fall out, which no doubt were the foules called Barnakles" (Wilson, 1832). The same writer describes a tree from the fruit of which develops the Barnacle Goose. Of this tree he says . . . "this wonder of England, for the which God's name be ever honoured and praised. There are to be found in the north parts of Scotland, and in the islands adjacent, called Orchades, certaine trees whereon do grow certaine shells of a white colour tending to russett, wherein are contained little living things, which shells in time of maturitie do open and out of them do grow those little living creatures, which falling in the water do become fowles, which we call Barnakles, and in Lancashire tree-geese, but the other that do fall upon the land perish and come to nothing" (Thomson, 1934). The worthy naturalist was evidently in error as the breeding grounds of this species were definitely discovered in 1921, and while the young do first see the light of day in very strange places, yet the circumstances are not as incredible as those described by Gerard 324 years earlier.

The breeding grounds are in eastern Greenland and in Spitsbergen. The Oxford expeditions in 1921 and 1922 succeeded in locating a number of nests of this species in Spitsbergen, and of the nesting habits the Rev. F. C. R. Jourdain, in notes quoted by Bent (1925), says: "Probably in order to escape the attentions of the Arctic foxes this species has acquired the habit of nesting on ledges and hollows in precipitous bluffs, and even on the tops of isolated pinnacles of rock. . . . The gander stands close by his mate on watch, and his white face may be detected with a good glass from a considerable distance. . . . The sites varied to some extent, some nests were on gently sloping declivities, sparsely covered with lichens and mosses, at the foot of a low cliff



Goose-bearing tree, as illustrated in Gerard's "Herbal," 1597

or on ledges on its face, and with a drop of 10 to 20 or 30 feet below; others were on projecting spurs of rocks reached by a narrow 'knife-edge' from the main face of the cliff; one was in a small cave over-hung from above and with a sheer drop below; and a bird was observed sitting on the flat top of a mushroom-shaped pinnacle of rock, at the very top of a high cliff. In practically every case where the female was incubating eggs, the male was standing close beside her." These birds were again found nesting on a range of hills some 1,500 to 1,700 feet high, and nests were found below which "was a range of cliffs, steep screes and bluffs, reaching for quite 1,200 feet by aneroid to the innumerable streams at the foot of the valley." Of these cliff-nesters, in northeastern Greenland, Manniche (1910) writes: "It was only on the steep and absolutely naked middle part of the mountain wall that the geese had their quarters and in no place lower than some 200 meters from the base of the cliff."

The Barnacle Goose lays from 3 to 6, usually 4 to 5, pure white eggs, the average size of which is 3.01 by 1.98 inches. Referring to the young, Jourdain in his notes says: "They must then scramble or fall down the cliffs, probably being to some extent helped by the strong updraft of wind sweeping up the side of the valley, and then make their way down the screes till they reach the flat ground at the foot of the valley, when they take to the water and are carried down to the marshes at the head of the bay. . . . There, however, seems to be no evidence that the parents give them any assistance, though it would seem improbable for a newly hatched bird to descend a perpendicular cliff nearly 100 feet in height."

Barnacle Geese are very common on the west coast of Scotland, whence they depart for their breeding grounds about the end of April or the beginning of May. In appearance they are much like the Brants, though not nearly as maritime in their habits and their feeding. While they do feed to some extent on the mud flats and foreshores left uncovered by the tide, their favourite feeding localities, according to Witherby's Handbook (1921), "are wide stretches of 'machar' land of firm springy turf inside sandhills. A common trait in all geese, but more noticeably so in this species, is a continual series of friendly quarrels amongst a feeding flock. Less inclined to associate with other geese than any other species, and never nearly so unapproachable, it is the 'fool' amongst geese, and only one which on occasion will fail to take alarm after having seen and distrusted a moving object within 100 yards. . . . Almost if not quite insensitive to scent of man, and rarely if ever takes alarm from it."

There are several records of the Barnacle Goose having been taken in the autumn in various places in eastern North America. Any specimen which may be shot should be reported to the Fish and Wildlife Service, Washington, D. C., or to the National Museum of Canada, Ottawa, Canada.

Emperor Goose

Philacte canagica
(fi-lák-te, kan-áj-i-ka)

Colour Plate No. 3. Downy Young No. 32.

SCIENTIFIC NAME

Philacte, from Greek, *philos*, meaning loving, and *akte*, meaning the seashore; *canagica*, Latinized form, meaning of the island of Kanaga or Kyktak.

COLLOQUIAL NAMES

Beech goose; painted goose; white-headed goose.

DESCRIPTION

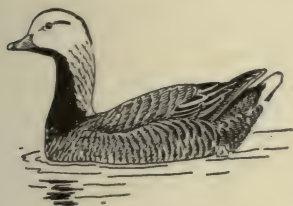
ADULTS, BOTH SEXES. *Head* and back of *neck*, white, though often suffused with rusty stain; *chin*, *throat* and *foreneck*, brownish black, definitely outlined against white of face and *hind neck*; dark of foreneck merges into colour of chest; *bill*, upper and lower mandibles, pale purplish or flesh colour with white *nail*; lower mandible, flecked with black; *eye*, hazel or brown. *Body* *Back*, *scapulars*, *chest* and *sides*, silvery grey, feathers terminating in black followed by whitish tips, giving impression of continuous black and white bars on ashy background; *breast*, *belly* and *flanks*, like back, but pattern finer and whitish tips often stained yellowish; *lower back* and *rump*, ashy brown, feather-tips paler; *feet*, bright orange yellow, *claws* black. *Tail*, white; *upper coverts* like rump; *under coverts*, similar, but feathers usually more markedly tipped with whitish or yellowish. *Wings*. All *coverts*, bluish ash, with black then white tips to feathers; *primaries*, silvery grey, dusky near tips; *secondaries*, silvery grey, basally, slaty black near tips, with white edgings; *tertiaries*, black with white edgings; *lining* and *axillars*, silvery grey.

JUVENILE. During first autumn, generally similar to adults, except white of *head* and *neck*, spotted with dusky; brown, instead of black barring, on *back*; *bill*, duller; *feet*, paler. After complete moult during summer, plumage fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A medium-sized goose, with ashy plumage barred with black and white. Chief distinguishing features, (a) head and hind neck, white (often suffused with rusty), definitely outlined against black foreneck, (b) feet, orange yellow.

The only other geese with yellow feet are the White-fronted and Tule geese. The head and the entire neck of the somewhat similar Blue Goose are white.



JUVENILES. Closely resemble the adults. See "Description."

FIELD MARKS

(A maritime species of the southwest coast of Alaska.)

ON THE WATER. The silvery-grey body, and the white head and hind neck sharply contrasted against the black foreneck are the markings which identify the Emperor. It is a medium-sized goose with a thick-set build. The all-white neck of the Blue Goose will distinguish that species.

IN FLIGHT. Its all-grey body, relieved only by the white head and tail, its short neck, heavy body and rapid wing-beats readily identify it. Its flight is like that of the Black Brant, but is less rapid and agile.

VOICE. Its note is shriller and different from that of any other goose. In flight it utters a *kla-ha, kla-ha, kla-ha*; when alarmed and rising from the water, a deep, ringing *u-lugh, u-lugh*; when feeding in flocks, they utter a variety of conversational notes.



LIFE STORY

The Emperor Goose, "the handsomest and the least known of American geese, is confined to such narrow limits, both in its breeding range and on its migrations, that it has been seen by fewer naturalists than any other goose on our list. On the almost inaccessible, low, marshy shores of Alaska, between the mouths of the Yukon and Kuskokwim Rivers, it formerly bred abundantly, but recent explorations in the region indicate that it has been materially reduced in numbers. . . . The decrease is partially, if not wholly, due to the fact that large numbers are killed every year and their eggs taken by the natives, even within the limits of what is supposed to be a reservation" (1 Bent, 1925). Stragglers are frequently found on the western coast of America as far south as California, and this essentially maritime goose has wandered as far south as Hawaii.

Of their courtship Nelson (1913) says: "Almost at once after their arrival. . . the Emperor Geese appeared to be mated, the males walking around the females, swinging their heads and uttering low love notes, and incoming flocks quickly disintegrated into pairs which moved about together, though often congregating with many others on flats and sandbars. The male was extremely jealous and pugnacious, however, and immediately resented the slightest approach of another toward his choice; and this spirit was shown equally when an individual of another species chanced to come near. When a pair was feeding, the male moved restlessly about, constantly on the alert, and at the first alarm the pair drew near one another, and just before taking wing uttered a deep, ringing *u-lugh, u-lugh*; these, like the flight notes, having a peculiar, deep tone difficult to describe."

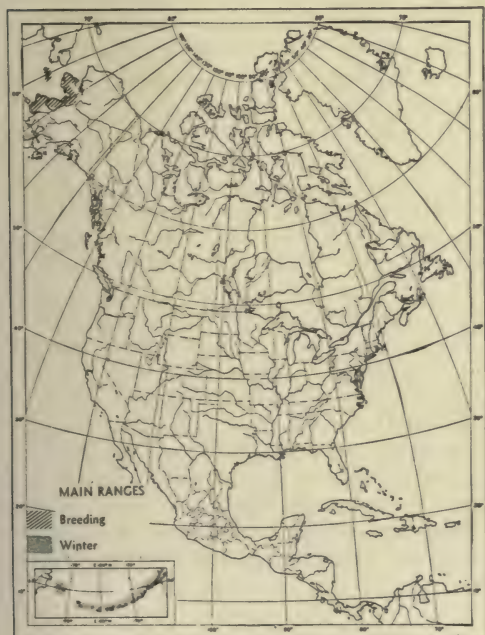
In Alaska the nests are placed on the flat marshy islands bordering the sea all along the middle and southern part of the delta. Along the sea coasts the eggs are laid among bleached and wave-torn scraps of driftwood lying along the highest tide marks. The number of eggs

varies from 3 to 8, but 5 or 6 is probably the usual number; the colour is creamy white and the average size is 3.09 by 2.05 inches. The period of incubation is 24 days. The young are hatched the last of June or early July, and are led about the tundras by both parents until the last of July and the first of August when the old birds moult their flight-feathers and, with the still unfledged young, are extremely helpless.

Of the habits of the Emperor Geese on their breeding grounds in Alaska, Conover (1926) says: "These geese lose very little time in starting to nest after their arrival on the breeding ground, as on May 27 a female was shot that already had her breast partly picked. The first eggs were not found, however, until June 2. . . . Six was the highest number found by our party. About Point Dall they seemed to prefer as nesting sites the inland ponds and marshes situated in the low rolling hills, rather than the marshy flats bordering the bay and sea. Nests were generally placed close to water, either near the bank of some pond, on an island, or on the top of a large tussock in some wet marshy place. They were lined with moss, grass, and down from the parent. The females sat very close, generally not flushing until one was within ten or fifteen feet. The surprising thing, however, was in not finding the gander in close attendance. At first it was thought that the male probably took little interest in the nest, but this was found not to be entirely correct. At one nest, situated on an island in a pond, what was presumably the gander was seen several times sneaking about several hundred yards away. In an-

other case when a female was disturbed from her eggs, she was joined by two other geese when she lit some way off. One of these, thought to be her mate, kept constantly with her, while the other stayed some little distance away. As there was another Emperor nest less than a quarter of a mile off, it was presumed that the odd bird was also a gander and mate to this other hen. As soon as the young are hatched the male joins his mate, however, and helps take care of the goslings.

"One morning, on visiting the nest on the island above referred to, the first thing that caught our eye was a newly hatched chick sitting on the edge of the nest beside its mother. As we drew closer the female flushed, and with



her went the gander, who had evidently been crouched on the ground about ten feet away. All five eggs had hatched and the young were already dry. The goslings were surprisingly tame, making no attempt to leave the nest, although both old birds had lit in the lake about fifty yards away and the hen was calling loudly. After a few minutes they did crawl out, but to our surprise came to us as we stood photographing them, utterly ignoring the old geese." Wishing to get photographs of the adults, the photographer "took one of the young and placed it some distance from the nest as a decoy. The minute he backed away, however, it started in pursuit of him, so that finally he had to tether it by the foot to a bunch of grass. Meanwhile the other four seemed perfectly content to sit in my lap, where they were sheltered from the wind; and if I covered them with my hands, would snuggle down and give contented little chucking calls. We had these five for two days and they fed readily on finely cut grass and hard-boiled egg....

"During the first half of July, broods of these geese were seen commonly back of Igiak and Hooper Bay. When the young are first hatched, the old birds appear to take them to the rivers and sloughs, up and down which they travel, feeding on the banks. It was during this period that we noticed how the glaucous gulls persecuted them. Whenever a brood was encountered as we travelled the sloughs in our boat, the old geese would fly off and the goslings would scatter. Immediately these big gulls gathered, and as soon as a chance offered, would swoop down on a young one. Later, when we attempted to band these geese, this was a serious handicap, as necessarily broods became much scattered and were at the mercy of marauders. Under natural conditions many goslings must be destroyed, as often the old geese were seen at some distance from their young; and wherever there was a brood, there was almost sure to be a gull or two hanging about....

"From what evidence we could gather, it would seem that the Emperor Goose never nests farther back than ten miles or so from the coast. As the majority of Eskimo villages in this region are situated near the coast, it is this species that suffers most in their goose drives. Generally the natives go to the same spot each year for their drives, which are made about the end of the first week in August." Of the destruction of these geese by the natives, Nelson (1913) says that while these and myriads of other geese are in the flightless condition, the Eskimos make "a practice of setting up long lines of strong fishnets on the tundras to form pound traps, or inclosures with wide wings leading to them, into which thousands were driven and killed for food. The slaughter in this way was very great, for the young were killed at the same time and thrown away in order to get them out of the way of the next drive. The Esquimos of this region also gather large numbers of eggs of the breeding waterfowl for food and, with the demand for them at the mining camps of the north, a serious menace to the existence of these and other waterfowl might ensue." This description was, of course, published before adoption of The Migratory Bird Convention.

"The principal winter home of the Emperor Goose is on the seacoast of south-western Alaska, and only stragglers reach California. But it is probable that if all the Emperor Geese ever observed in California had been recorded, it would be found that almost every year one or two of the birds had made their way within our borders....In spite of the fact that this as a marine species, most of the records are from the interior valleys" (Grinnell, Bryant, and Storer, 1918).

Of the flesh of the Emperor Goose, Turner (1886) says: It is "scarcely to be thought of as food. There is a disgusting odor about this bird that can only be removed in a degree, and then only by taking off the skin and freezing the body for a time. Even this does not rid the flesh entirely of strong taste." Conover (1926) says: "The strong, rank odor of these geese spoken of by other writers was not noticed among the birds we took. Many of them were eaten and not found at all unpalatable."

White-Fronted Goose

Anser albifrons albifrons

(án-ser, ál-bi-fronz)

Colour Plate No. 4. Downy Young No. 32

SCIENTIFIC NAME

Anser, Latin, meaning a goose; *albifrons*, from Latin *albus*, meaning white, and *frons*, meaning forehead, referring to the white front of this goose.

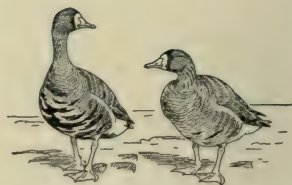
COLLOQUIAL NAMES

IN GENERAL USE: Specklebelly; specklebelly brant. IN LOCAL USE: Brant; California goose; checkerbelly; checkerbreast; China goose; gray brant; gray goose; gray wavy; laughing goose; marbled-breast; mottled brant; mottled goose; oie caille (quail goose, probably because of the barred plumage); oie nonnette (nun goose, suggested no doubt by the "white front"); pied brant; speckled brant; speckled goose; specklebreast; speckle-breasted brant; specklebreast goose; spotted brant; spotted goose; Texas goose; whitefront; yellowlegged goose; yellowlegs.

DESCRIPTION

ADULTS, BOTH SEXES. *Head* and entire *neck*, brownish grey; white band around front of *face* at base of *bill* and on chin, bordered behind with blackish (the "white-front"); *bill*, pink, pale bluish at base, yellow orange about nostrils, a little shorter than head, high at base, tapering to tip, slight "grinning" patch only; *nail*, white or whitish; *eye*, brown; skin at edge of *eyelid*, greyish brown. *Body*. *Back*, greyish brown, feathers with paler tips; *lower back* and *rump*, dark brown to slaty brown; *scapulars*, like back; *chest*, ashy grey to greyish brown; *breast*, greyish white, irregularly splashed in varying degree with dusky brown or black (specklebelly); *belly* and *flanks*, white; *sides*, like back, but pale feather-tips broader, upper edges of longer side-feathers, white, producing a white line along

sides; *feet*, orange or yellowish. *Tail*, like rump, and broadly to narrowly tipped with white, under-surface of tail, light to dark grey; *upper* and *under coverts* white, *Wings*. *Coverts*, greyish brown, middle coverts tipped with ashy white, the greater more broadly tipped with whitish, giving a double wing-bar effect; *primaries*, black, ashy grey basally, with whitish shafts; *secondaries*, dusky brown; *tertials*, brownish, margined outwardly with white, inner webs, brownish black; *lining* and *axillars*, slate grey.



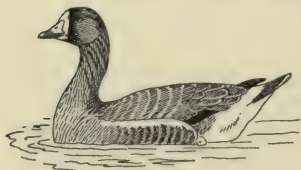
The black marking on the breast is variable

JUVENILE. During first autumn, similar to adult but, in general, more uniform grey and paler below. Lacks white face-patch; pale tips to *body* and *wing* feathers may be narrower or wanting and no black cross-patches on *breast*. White upper *tail-coverts* mixed with greyish brown. *Bill*, dull yellowish, or grey with lilac tinge; *nail* dusky. After complete moult during following summer plumage is fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A medium-sized, greyish-brown goose with a mixed black-and-whitish breast. Chief distinguishing features (a) white band around face at base of bill (the "white front"), (b) breast, whitish, irregularly splashed with black or dusky brown, (c) skin at edge of eyelid, greyish brown, (d) feet, yellowish.

Features (a) and (b) distinguish this goose from all but the Tule Goose, which is larger, of darker general coloration and has the skin at edge of eyelid orange yellow instead of greyish brown. (See "Specimen Identification" of Tule Goose.) The Emperor Goose also has orange-yellow feet but there the resemblance ceases.



JUVENILES. Juvenile White-fronts and juvenile Tule Geese are similar to juvenile Blue Geese, but in the last species young birds have dark feet and black "grinning" patch on side of bill. See "Description."

FIELD MARKS

(Abundant in western half of continent; rare in eastern.)

ON THE WATER. A medium-sized, dark goose, distinctive in being the only adult with the head, neck, chest and upperparts, solidly brown, except for the "white front."

IN FLIGHT. The splashed black-and-white breast, white tail-coverts and yellow legs are noticeable if not too distant. In migration they fly high, in V-shaped flocks and resemble Canada Geese, for which they may easily be mistaken. Both on water and in flight this race is indistinguishable from the Tule Goose, which, however, is restricted in its winter range to the Upper Sacramento Valley in California.

VOICE. A long, clanging, oft-repeated cackle, *wah-wah-wah-wah*, uttered while in flight, resembling laughter.



LIFE STORY

The White-fronted Goose, while very rare on the eastern half of the continent, is comparatively abundant throughout the West. The breeding range of this variety is practically circumpolar, and White-fronts are common throughout most of the Northern Hemisphere. On this continent they are popularly known as "laughing geese," due to the peculiar cry of the bird. They are also commonly known as "grey wavys," the word wavy being a corruption of the Indian word "wa-wa" meaning wild goose; and both here and in England the term "specklebelly" is commonly used. The flesh of these geese is very desirable and they are much sought by gunners. The White-front is very similar to its close relative the Tule Goose. The main difference is one of size, the Tule being larger and bearing about the same relation in size to the White-front that the Honker does to the Lesser Canada Goose.

Large numbers of the White-fronted Geese of Europe winter around the Mediterranean Sea, and it may be that the classical and historic flock of geese that saved Rome were of this variety! The story may bear repeating: "The tradition is that when the Gauls invaded Rome a detachment in single file clambered up the hill of the capitol so silently that the foremost man reached the top without being challenged; but while he was striding over the rampart, some scared geese, disturbed by the noise, began to cackle, and awoke the garrison. Marcus Manlius rushed to the wall and hurled the fellow over the precipice. To commemorate this event, the Romans carried a golden goose in procession to the capitol every year." (Brewer, 1902). This is said to have occurred in B. C. 390.

Bridging the gap to the year 1940, it is interesting to read an extract from the Weekly Edition of the Times, London, which says "There has been a new and most interesting night sound this week—in the excitement of the geese at the approach of a German raider. Before the sirens have sounded, even before the human ear has caught the drone of an aeroplane overhead, there has been an outburst of angry cackling from these historic sentinels."

Of the arrival and nesting of this goose in Alaska, Nelson (1887) says: "When the White-fronted Goose first arrives in the north the lakes are but just beginning to open and the ground is still largely covered with snow. The last year's heath berries afford them sustenance, in common with most of the other wild fowl at this season. As the season advances they become more numerous and noisy. Their loud call notes and the cries of the males are heard everywhere. The mating season is quickly ended, however, and on May 27 . . . I found their eggs at the Yukon mouth. From this date on until the middle of June fresh eggs may be found, but very soon after this latter date the downy young begin to appear. These geese choose for a nesting site the grassy border of a small lakelet, a knoll grown over with moss and grass, or even a flat, sparingly covered with grass. Along the Yukon, Dall found them breeding gregariously, depositing their eggs in a hollow scooped out in the

sand. At the Yukon mouth and St. Michael they were found breeding in scattered pairs over the flat country. Every one of the nests examined by me in these places had a slight lining of grass or moss, gathered by the parent, and upon this the first egg was laid; as the complement of eggs is approached the female always plucks down and feathers from her breast until the eggs rest in a soft warm bed when with incubation commences."

The number of eggs will vary from 4 to 7, though 5 or 6 constitute the usual set. The colour varies from light buff to creamy white, or pale pinkish white, and the average size is 3.11 by 2.07 inches. The period of incubation is about 28 days. The male does not desert the female during the process and both parents assist in the care and protection of the young. Hersey encountered a family of these birds on the Yukon delta and, in notes quoted by Bent (1925), describes the encounter as follows: "On the edge of a little pond on the tundra about 5 miles back from the mouth of the river I found a pair of these geese and a brood of five young. The birds had been resting under a clump of dwarf willows, and on my approach the old birds came out into the open and attempted to lead the young away over the open tundra. The young, although not more than a day or two old, could run as fast as a man could travel over the rough ground. I had to remove my coat before I could overtake them. They did not scatter, but ran straight ahead, keeping close together, one of the parents running by their side and guiding them and

the other flying along above them and not more than 3 feet above the ground. The young kept up a faint calling, and the old birds occasionally gave a low note of encouragement." Nelson (1887) says: "The young are pretty little objects and are guarded with the greatest care by the parents, the male and female joining in conducting their young from place to place and in defending them from danger."

During the flightless period many of these geese are captured by the natives of the North for food. A method of securing the birds, related in MacFarlane's unpublished notes, is quoted by Bent (1925) as follows: "We observed about 30 geese...on



the edge of a small lake (in the water) in the Barren Grounds; they were all ganders, and molting. On our approach they went sailing (swimming) across the lake, which was about 2 miles in extent. Our party then divided—half taking one side, and half the other side of the lake—and by the time we reached the spot where the geese had quitted the water, they had all concealed themselves as well as the scant grass and low tangled willows in the vicinity would permit. After we discovered their whereabouts there was some sport and a lively chase after them, and we soon succeeded in securing 27 out of the 30—the remaining 3 having escaped beyond our reach, although followed for some distance into the water. They were all in good condition, in fact, grey wavies are always fat and excellent eating, while it is but seldom in spring and never in summer that a really good Canada Goose is met with. The Indians inform me that when they observe a flock of swans or geese on a lake, during the molting season, they at once make a fire on the shore, and they state that this course on their part never fails to drive the geese, etc., on land, where most of them easily fall prey to the hunter. If they were only wise enough to remain in the water at a proper distance they would be safe enough."

These geese are often early migrants in the autumn and they may frequently be seen early in September on their wintering grounds in California, long before the arrival of the other Arctic-breeding geese. That the date of their departure largely depends upon the weather is shown from the following observations of Nelson (1887), who says: "All through September, old and young, which have been on the wing since August, gather in large flocks, and as the sharp frosts toward the end of September warn them of approaching winter, commence moving south. The marshes resound with their cries, and after some days of chattering, flying back and forth, and a general bustle, they suddenly start off in considerable flocks, and a few laggards which remain get away by the 7th or 8th of October."

The flight of the White-fronted Goose has been well described by Blanchan (1898) as follows: "A long clanging cackle, *wah, wah, wah*, rapidly repeated, rings out of the late autumn sky, and looking up, we see a long, orderly line of laughing geese that have been feeding since daybreak in the stubble of harvested grain fields, heading a direct course for the open water of some lake. With heads thrust far forward, these flying projectiles go through space with enviable ease of motion. Because they are large and fly high, they appear to move slowly; whereas the truth is that all geese, when once fairly launched, fly rapidly, which becomes evident enough when they whiz by us at close range. It is only when rising against the wind and making a start that their flight is actually slow and difficult. When migrating, they often trail across the clouds like dots, so high do they go...as if they spurned the earth. But as a matter of fact they spend a great part of their lives on land; far more than any of the ducks. On reaching a point above the water when returning from the feeding grounds the long defile closes up into a mass. The geese now break ranks, and each for itself goes wheeling about,

cackling constantly, as they sail on stiff, set wings; or, diving, tumbling, turning somersaults downward, and catching themselves before they strike the water, form an orderly array again, and fly silently, close along the surface quite a distance before finally settling down upon it softly to rest."

In earlier times geese were hunted in the West, using a bullock as a moving blind; this method is described by Coues (1874) as follows: "As is the case with other species, they are often hunted, in regions where they have become too wild to be otherwise successfully approached, by means of bullocks trained for the purpose. Though they may have learned to distrust the approach of a horse, and to make off with commendable discretion from what they have found to be a dangerous companion of that animal, they have not yet come to the same view with respect to horned cattle, and great numbers are slaughtered annually by taking advantage of their ignorance. The bullock is taught to feed quietly along toward a flock, the gunner meanwhile keeping himself screened from the birds' view by the body of the animal until within range.... Man's ingenuity overreaches any bird's sagacity, no doubt, yet the very fact that the geese, which would fly from a horse, do not yet fear an ox, argues for them powers of discrimination that command our admiration."

Of the food of this species, Audubon (1840) says: "In feeding they immerse their necks, like other species; but during continued rains they visit the cornfields and large savannahs. While in Kentucky they feed on the beech nuts and acorns that drop along the margins of their favourite ponds. In the fields they pick up the grains of maize left by the squirrels and raccoons, and nibble the young blades of grass. In their gizzards I have never found fishes nor water lizards, but often broken shells of different kinds of snails." Turner (1886) says: "It inhabits the fresh-water lagoons, and is essentially a vegetarian. The only animal food found in their crops was aquatic larvae and insects. I am not aware that it eats shellfish at any season of the year. The young grass shoots found in the margins of the ponds form its principal food." Nelson (1887) says: "During August and September the geese and many other wild fowl in the north feed upon the abundant berries of that region and become very fat and tender." Bent (1925) says: "In the interior valleys of California, where it spends the winter, and on its migrations through agricultural districts, it feeds in the grain fields on fallen grain in the fall and on the tender shoots of growing grain in the spring."

In the spring the flocks of White-fronts commence moving north early in March; April is usually the month of the heaviest flight, and by the beginning or middle of May the birds are once again on their summer breeding grounds. The main autumn flight takes place in September and October.

Tule Goose

Anser albifrons gambelli
(án-ser, ál-bi-frons, gám-bel-i)

Colour Plate No. 4. Downy Young No. 32.

SCIENTIFIC NAME

Anser, Latin, meaning a goose; *albifrons*, from Latin *albus*, meaning white, and *frons*, meaning forehead, referring to the white front of this goose; *gambelli*, after William Gambel, 1819-1849, a protege of Nuttall; he was one of the first ornithologists to visit California. The vernacular name "Tule" (pronounced Tu-lee) was bestowed on this goose from its habit of frequenting sloughs and ponds surrounded by willows and tules.

COLLOQUIAL NAMES

IN GENERAL USE: Specklebelly; specklebelly brant. IN LOCAL USE: Brant; California goose; checkerbelly; checkbreast; China goose; gray brant; gray goose; gray wavy; laughing goose; marbled-breast; mottled brant; mottled goose; one caille (quail goose, probably because of the barred plumage); oie nonnette (nun goose, suggested no doubt by the "white front"); pied brant; speckled brant; speckled goose; speckle-breast; speckle-breasted brant; specklebreast goose; spotted brant; spotted goose; Texas goose; timber goose; yellowlegged goose; yellowlegs.

DESCRIPTION AND SPECIMEN IDENTIFICATION

ADULTS, BOTH SEXES. Identical with White-fronted Goose except (a) larger, (b) darker in general coloration, (c) neck, darker brown and longer proportionally, (d) head, dusky brown instead of brownish grey, (e) skin at edge of eyelid, orange instead of greyish brown, (f) male normally has 18 tail-feathers while male White-front normally has 16; females of both species normally have 16.



In an article on the variations in the differences between the Tule Goose and the White-fronted Goose, A. M. Bailey, after a careful examination of a large number of White-fronted Geese, concluded that there was no uniformity in the colour of the eye-ring; some were yellow, as has been given as a character of the Tule Goose, some were dark, and others were a rather light brown; fairly large birds were apt to have the eye-ring brownish, while in smaller birds it was yellowish. With regard to the number of tail-feathers, while it is probable that the majority of the male Tule Geese have eighteen tail-feathers, this is not constant, and we find both a male and a female of the smaller form with seventeen tail-feathers. So it would seem that the differences between the two forms of White-fronts are only colour and size.

Comparative bill sizes
Above, White-fronted Goose.
Below, Tule Goose.

JUVENILE. See White-fronted Goose.

FIELD MARKS

(Found, in winter, only in Upper Sacramento Valley, California.)

ON THE WATER AND IN FLIGHT. Usually seen in singles or pairs, never in large flocks; darker and larger, and seemingly longer of neck, and with more measured wing-beats than White-fronted Goose; difficult to distinguish in the field from that variety. See White-fronted Goose.

VOICE. Similar to, but coarser and harsher than that of the White-fronted Goose.

LIFE STORY

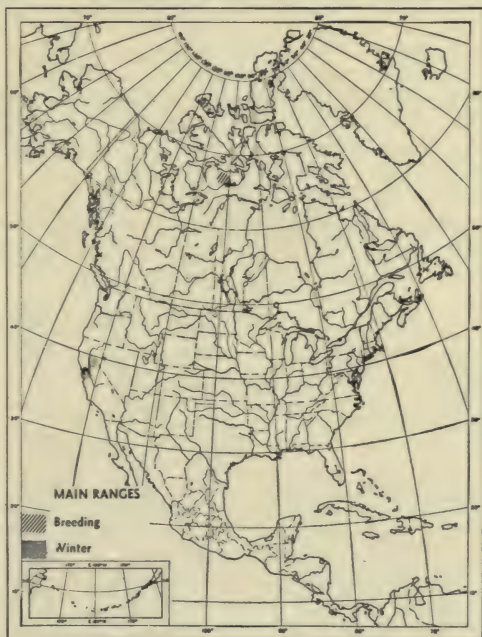
The Tule Goose (pronounced Tu-lee) is a larger edition of the White-fronted Goose, bearing the same relationship in size to that bird that the Honker does to the Lesser Canada Goose. It winters in limited numbers at certain points in the Sacramento Valley in California, particularly in the Butte and Sutter Basins of that district.

Its validity as a subspecies was definitely established by Swarth and Bryant (1917) who comparing the two varieties in certain of their habits, say: "The two kinds flock separately, for the most part; the larger race is never seen in such big flocks as is customary with the other, but is most frequently noted singly or in pairs; also that while the smaller variety is a common frequenter of grain fields and uplands generally the larger one is preeminently a denizen of open water or of ponds and sloughs surrounded by tules and willows. The predilection of the latter species for such localities has given rise to the local names by which it is known, 'tule goose' or 'timber goose' as contrasted with the upland-frequenting 'specklebelly'."

The location of the breeding grounds of the Tule Goose, up to the summer of 1941, was an unsolved mystery. With the comparatively recent discovery of the nesting grounds of the Blue and Ross's Geese, the Tule Goose was the only one of our wild fowl whose summer range remained unknown. On July 26, 1941, however, Angus Gavin, Hudson's Bay Company's Post Manager at Perry River in the Canadian Arctic, found the Tule Goose nesting on islands and on the banks of a large unnamed lake, east of the first tributary of the Perry River and about six miles from its confluence. Several nests were found. It was while on his way to revisit the Ross's Goose breeding grounds (which he and Ernest Donovan discovered the year before) that he made the discovery of the summer home of the elusive Tule Goose. Gavin estimated that he saw about 300 pairs of these geese in the vicinity. He also found a nesting colony of the smaller White-fronted Geese about six miles away from the nesting Tule Geese, and states that the two varieties of White-fronts kept strictly apart. A specimen of the large Tule Goose and of the smaller White-fronted Goose were shot. From the marked difference in the estimated weights of the two birds, Gavin, a most reliable observer, feels confident that he has probably found the nesting grounds of the Tule Goose. Thus the last outstanding hiatus in our knowledge of the summer breeding grounds of North American wildfowl has been filled. The foregoing facts were released in "News Flight" No. 41-101, issued by Ducks Unlimited, Winnipeg, Canada.

The habits and behaviour of this goose are dealt with in an article by Moffitt (1926) who says that he found the Tule Goose only along the heavily wooded banks of the larger sloughs of Butte and Sutter counties of California, "where they apparently remain throughout the day, feeding in the small ponds formed by openings in the heavy tule growth of the surrounding overflowed marsh. Here they may be seen to best advantage in the morning between seven or eight and ten o'clock, when nearly all other geese, including the smaller White-fronted, are absent from the marshes, having repaired to the stubble fields for their morning meal. At this time, due to the absence of other geese, they are more noticeable, and may often be seen changing their positions by low flights over the marsh. After ten or eleven o'clock, due to the return of other geese to the tule swamps, where they loaf until time for the evening feeding, the Tule Geese are naturally much less in evidence. This, and the fact that only once have I noted them in barley fields, suggests that this form may obtain most of its food in the marshes rather than subsisting in large part on grain, like other geese of the region." The barley field referred to "more nearly resembles the chosen wooded habitat of the bird than the usual conception of a grain field, for, situated on a promontory formed by a sharp bend of the river, of some hundred odd acres extent, and liberally dotted with large Valley Oaks, with the river on the other side of the bordering levees, it indeed assumed such characters.

"In flight, due to large size and more than proportionately longer neck... and also, I believe, to slower, more measured wing beats, the Tule Goose may be distinguished from its smaller relative in the field. White-fronted Geese usually fly about at a considerable elevation, at least 300 to 400 feet above the ground, and sometimes much higher. In alighting they ordinarily descend in a series of cautious circles without any member of the flock uttering a sound (except a low and peculiar nasal wheeze, not audible unless the birds are in close proximity, and evidently a cautionary note) until within about 25 feet of the ground, when all simultaneously start a high-pitched



gabble, continued during the flapping descent and until the flock adjusts itself to its new surroundings. Tule Geese fly rather close to the ground, at least over the marshy country, seldom attaining an elevation of more than 200 feet and usually much less. Particularly when flying along sloughs, which they are wont to do, they seldom exceed 50 or 100 feet and often proceed only a few yards over the surface. This habit may be because their flights here are less protracted than those of the other form, and suggests that they may be more easily obtained, which is doubtless the case, though offset by the remote nature of their surroundings."

Flocks of Tule Geese are composed of fewer individuals than those of White-fronts. The same writer says: "Six to eight birds is probably the mode [the usual number] of the former, with twelve the highest number observed by me, and pairs rather numerous, while the latter form is often seen in much larger gatherings. . . . The voice of the Tule Goose . . . is noticeably harsher and coarser than that of the White-fronted Goose, as might be expected in a larger bird, and to me it is more stentorian. It does not seem to be so noisy a bird as the smaller form and landings are accompanied with much less cackling than those above described, being executed, in some cases, in absolute silence. . . . The Tule Goose is less shy than the White-fronted, often decoying without the usual wary circling of the latter."

Lesser Snow Goose

Chen hyperborea hyperborea
(*Chen hyperborea*, of Peters)

(Chen, hi-per-bo-re-a)

Colour Plate No. 5. Downy Young No. 32.

SCIENTIFIC NAME

Chen, Greek, meaning a goose; *hyperborea*, from Latin *hyperboreus*, meaning, beyond the north wind.

COLLOQUIAL NAMES

IN GENERAL USE: White brant; brant. IN LOCAL USE: Alaska goose; arctic goose; bald brant; Canadian goose; common wavy; Mexican goose; oie blanche (white goose); oie sauvage (wild goose); red goose; wavy; white wavy; white goose.

DESCRIPTION

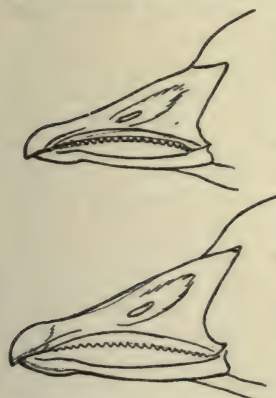
ADULTS, BOTH SEXES. Entire *plumage*, white, except *primaries*, black with grey bases, three outer ones emarginate at tips; *coverts* of *primaries*, grey. *Head* and *breast*, often stained with rusty brown; *bill*, pink to carmine red, with whitish *nail*, shorter than head, high at base and narrow; *nostril* in basal half; broad black area between closed mandibles known as "grinning patch"; *eye*, brown to dark brown; *feet*, dull lake red; *claws*, black.

JUVENILE. In first autumn general colour is grey, darker above and lighter below. *Head* and *neck*, mottled with brownish grey or dusky, faintly below, more heavily above, often stained rusty. *Back* and *scapulars*, ashy grey with lighter edges to feathers; *rump*, white; *breast*, washed or finely sprinkled with greyish and often stained rusty. *Tail* and its *coverts*, white. *Primaries*, slaty, shading to blackish at tips; *secondaries*, dusky, with lighter edges; *wing coverts*, ashy grey with lighter feather-edgings. *Bill*, dusky, becoming more pinkish through winter. During winter and spring much progress is made toward maturity by continuous moult. After first summer moult plumage is fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A medium-sized goose, all-white, except for black wing-tips. Chief distinguishing features (a) white plumage with black *primaries* and grey primary *coverts*, (b) reddish bill, with broad black "grinning patch."

The Greater Snow Goose is identical with the form described but is generally a larger, heavier, chunkier bird, with thicker neck and larger head and bill; as the two races intergrade in size, positive identification is difficult. The tiny Ross's Goose is similar in general coloration but can be separated by its very small size, warty protuberances on bill, and lack of black "grinning patch." Features (a) and (b) will separate from all other geese.



Comparative size of bills.
Above, Lesser Snow
Goose. Below, Greater
Snow Goose.

JUVENILES. Immature birds of this race and immatures of the Greater Snow are practically identical; both also resemble juvenile Ross's but the last is much smaller, lighter in general coloration and lacks the black "grinning patch" found on the bill of the Snow Geese. See "Description."

FIELD MARKS

(Abundant in the interior, west of the Great Lakes, and on the Pacific coast; accidental on Atlantic coast.)

ON THE WATER. A large, snow-white goose which, on account of its size and pure white plumage, is difficult to mistake for any other goose in locations where it is likely to be found. The black wing-tips are hardly notice-



able on the water unless the wings are flapped. The white swan has a different outline of body and neck; the diminutive Ross's Goose, its replica in miniature, is half the bulk. The similar Greater Snow Goose is strictly an Atlantic coast race, so that confusion is improbable.



IN FLIGHT. The snow-white plumage, with black wing-tips, will readily identify it. Snow Geese fly high and fast in long diagonal lines or in V-shaped flocks, chattering shrilly as they go. The similar but much smaller Ross's Goose is silent in flight.

VOICE. A shrill falsetto cry, and a shrill *honk*.

LIFE STORY

The Lesser Snow Goose is probably the most abundant of all the geese of this continent. In the Canadian west it goes by the name of "wavy," a corruption of the Indian word "wa-wa," meaning wild goose, and in the western and southern States, it is commonly called the "white brant." As its name *hyperborea* (from beyond the north wind) implies, it is a most northerly breeder, nesting on the Arctic coasts and islands of North America. It is found on its migrations west of the Great Lakes, and only as a straggler does it occur on the Atlantic seaboard. A very similar though somewhat larger bird, the Greater Snow Goose, is found in relatively small numbers on the Atlantic coast. The much smaller Ross's Goose, while of a different species, is a miniature of the Snow Goose, all three of these birds being of snow-white plumage with black wing-tips.

Sutton (1932) found the Lesser Snow Goose nesting on Southampton Island in Hudson Bay. While this island is not the main nesting ground of this species he found them as summer residents all over the western half of the island, and especially abundant at Cape Kendall where they were found nesting in association with the Blue Geese. The following account of the annual program of this goose is condensed from Sutton's report: "The Lesser Snow Goose returns from the south sometimes long before the snow and ice have completely melted from their favourite feeding and nesting grounds, usually during the first week of June. If they

find the tundras covered with snow they swim about in the salt water at the floe or rest on the ice at the floe-edge. . . . They do not dive, so they may have to live upon such bits of seaweed as they find attached to the ice, or upon crustaceans which swim about near the surface of the water. The earliest arrivals are eager to come inland to the gravel ridges where they can nibble at lichens, dig up roots, and swallow the coarse gravel. . . . Many of the Khanguk [Es-kimo name for the Snow Goose] are mated when they reach Southampton; others arrive in flocks and mating apparently goes on after the nesting grounds have been reached." At Cape Kendall, Sutton found occasional instances of pairing between the Blue and Lesser Snow Geese. His views on the hybridization of the two species are summarized in the "Life Story" of the Blue Goose.

The nest of the Lesser Snow Goose, says the same writer, "is situated on dry ground at the edge of a lake, sometimes at some distance from the water's edge, and often three or four miles inland from salt water. . . . by the time the set of eggs is complete there is a thick lining of down capable of covering all the eggs while the parent is away from the nest." From 4 to 8 eggs are laid, but the set is usually six. The eggs are a dull white or creamy white colour and the average size is 3.10 by 2.07 inches. "Only the female incubates. The male stands on guard, usually not far from the nest. The two birds are devoted to each other and stay together all the time during the period of incubation, while the young are attaining full size, and at the start of the southward migration." These geese probably mate for life. Manning (1942) found the incubation period to be 22 days, and observes that "the Snow Goose was a very close sitter, hard to flush, returning to its nest immediately."

Natural enemies of the adult birds on Southampton Island are few. "The Eskimos do not often kill them for food unless the geese happen to be very abundant. The eggs, however, are gathered eagerly by the natives, and nests are often destroyed by gulls, jaegers, foxes and ravens, especially if, for some reason or other, the eggs are left uncovered while the parent birds are away. . . . Young birds doubtless have many enemies, however, chief among them being, perhaps, the Arctic fox."



Bent (1925) says: "The food of the Snow Goose is largely vegetable, in fact almost wholly so during the greater part of its sojourn in its winter home. In the spring this consists largely of winter wheat and other sprouting grains and grasses; in the fall the stubble fields are favorite feeding grounds, where large flocks are known to congregate regularly."

Coues (1874) says: "Various kinds of ordinary grass form a large part of this bird's food, at least during their winter residence in the United States. They gather it precisely as tame geese are wont to do. Flocks alight upon a meadow or plain, and pass over the ground in broken array, cropping to either side as they go, with the peculiar tweak of the



bill and quick jerk of the neck familiar to all who have watched the barn-yard birds when similarly engaged. The short, turfy grasses appear to be highly relished; this explains the frequent presence of the birds in fields at a distance from water. They also eat the bulbous roots and soft, succulent culms of aquatic plants. In securing these the tooth-like processes of the bill are brought into special service."

The flight of the Snow Goose is usually high in the air in long diagonal lines or in V-shaped flocks, the

birds generally uttering a chorus of shrill, falsetto cries. Grinnell (1901) describes migrating Snow Geese as follows: "The spectacle of a flock of these white geese flying is a very beautiful one. Sometimes they perform remarkable evolutions on the wing, and if seen at a distance look like so many snowflakes being whirled hither and thither by the wind. Scarcely less beautiful is the sight which may often be seen in the Rocky Mountain region during the migration. As one rides along under the warm October sun he may have his attention attracted by sweet, faint, distant sounds, interrupted at first, and then gradually coming nearer and clearer, yet still only a murmur; the rider hears it from above, before, behind, and all around, faintly sweet and musically discordant, always softened by distance, like the sound of far-off harps, of sweet bells jangled, of the distant baying of mellow-voiced hounds. Looking up into the sky above him he sees the serene blue far on high flecked with tiny white moving shapes, which seem like snowflakes drifting lazily across the azure sky; and down to earth, falling, falling, falling, come the musical cries of the little wavies that are journeying toward the southland."

Regarding the start of the migration of these geese from their summer homes, Barnston (1862) says: "They are deliberate and judicious in their preparation for their great flight southward and make their arrangements in a very businesslike manner. Leaving off feeding in the swamps for a day or more, they keep out with the retreating ebb tide, re-

tiring, unwillingly as it were, by steps at its flow, continually occupied in adjusting their feathers, smoothing and dressing them with their fatty oil, as athletes might for the ring or race. After this necessary preparation the flocks are ready to take advantage of the first north or northwest wind that blows, and when that sets in, in less than 24 hours the coast that has been covered patchlike by their whitened squadrons and widely resonant with their petulant and incessant calls is silent as the grave—a deserted, barren, and frozen shore.” Sutton (1931) says: “On September 3, at about noon, we saw most of the geese tower higher and higher and finally separate into neatly arranged companies of from four to five to thirty birds; heard them change their tone of voice in some indescribable way; and watched them actually leave the region, apparently for good.”

Some idea of the erstwhile astounding abundance of this species may be gathered from the following quotations from the early writers. Coues (1874) says: “I have driven in a buggy along the open beach directly into a flock of Snow Geese that stood staring agape, ‘grinning’ the while, till they were almost under the horse’s hoofs; the laziest flock of tame geese that were ever almost run over in a country by-road were in no less hurry to get out of the way. Advantage is often taken of this ignorance to shoot them from a buggy.” Dr. Heermann, quoted by the same writer, says that they “often cover so densely with their masses the plains in the vicinity of the marshes as to give the ground the appearance of being clothed in snow. Easily approached on horseback, the natives sometimes near them in this manner, then suddenly putting spurs to their animals, gallop into the flock, striking to the right and left with short clubs, and trampling them beneath their horses’ feet. I have known a native to procure 17 birds in a single charge of this kind through a flock covering several acres.” Writing of the killing of these geese in the north by the natives for food, Barnston (1862), said “The Snow Goose . . . becomes, from its consolidated numbers, the first and greatest object of sport after the flocks alight in James Bay. The havoc spread throughout their ranks increases as the season advances and their crowds thicken, and even the Indian becomes fatigued with the trade of killing . . . it is no uncommon occurrence for a good shot, between sunrise and sunset, to send to his lodge about 100 head of game.”

This killing continued with unabated savagery until 1917, when the geese received their first measure of protection, and while the Lesser Snow Goose is not yet, and probably never will be, as abundant as in former times, it is today more plentiful than any other goose in America. It provides good sport for the gunner but its flesh is not held in the same high esteem as that of some of the other species.

Greater Snow Goose

Chen Hyperborea atlantica

(*Chen atlantica*, of Peters)

(Chen, hi-per-bo-re-a, at-lán-ti-ka)

Colour Plate No. 5. Downy Young No. 32.

SCIENTIFIC NAME

Chen, Greek, meaning a goose; *hyperborea*, from Latin *hyperboreus*, meaning, beyond the north wind; *atlantica*, Latinized form, meaning of the Atlantic Ocean.

COLLOQUIAL NAMES

IN GENERAL USE: White brant, often simply brant. IN LOCAL USE: Arctic goose; bald brant; Canadian goose; common wavy; oie blanche (white goose); oie sauvage (wild goose); red goose; wavy; white wavy; white goose.

DESCRIPTION AND SPECIMEN IDENTIFICATION

ADULTS AND JUVENILE. Identical with Lesser Snow Goose, except generally larger, heavier and chunkier, with thicker neck and larger head and bill. (See Lesser Snow Goose.)

FIELD MARKS

(Winters along the coast from Maryland to North Carolina, and visits the lower St. Lawrence River on migration).

ON THE WATER AND IN FLIGHT. Same as those of the Lesser Snow Goose.

VOICE. The call is similar to that of the Blue Goose. Though noisy at times, these geese are, perhaps, the most silent of their kind.

LIFE STORY

The Greater Snow Goose, whose poetic scientific name, *hyperborea*, means "from beyond the north wind," is somewhat larger than, but otherwise identical with, the Lesser Snow Goose of the west; some authorities, however, consider it to be a distinct species. It is exclusively a bird of the Atlantic coast, breeding in the more northern part of the Arctic Archipelago of Canada and in northern Greenland, stopping on its migrations on the lower St. Lawrence River and wintering off the coasts of Maryland, Virginia, and North Carolina.

The entire population of Greater Snow Geese visits the lower St. Lawrence River on their spring and autumn migrations and appears to be on the increase. White and Lewis (1937) says: "About thirty-five years ago the maximum number of Greater Snow Geese to be found at St. Joachim was between 2,000 and 3,000. Since then they have increased in numbers so that now there are at least 10,000 birds in the flock, which probably includes all the Greater Snow Geese in existence." Dr. Lewis in notes recently sent to the author says that there were about 18,000 Greater Snow Geese in the flock at St. Joachim in the autumn of 1940. The same writers say: "The area at St. Joachim on which they spend most of their time while in that region is a preserve belonging to the Cap Tourmente Fish and Game Club. The Greater Snow Geese, while

on this preserve, are protected by both the Royal Canadian Mounted Police and the warden of the Club, with the result that they enjoy practically complete protection during their spring sojourn, and the hunting of them that takes place in the autumn is limited and carefully controlled. A few birds, of course, are taken outside the preserve during the hunting season, but the total number of Greater Snow Geese killed annually on the entire St. Lawrence River area frequented by them is less than four hundred."

Nowhere on the mainland of North America are the Greater Snow Geese known to nest. Langdon Gibson, ornithologist of the Peary expedition of 1891 and 1892, found these birds breeding in northern Greenland in the vicinity of McCormick Bay, latitude 77 degrees 40 minutes north. He says: "It is my good fortune to record, for the first time, the breeding of this species in north Greenland. A family was found in Five Glacier Valley on July 11, 1892. The male disputed my advance with head lowered and much hissing, quite after the fashion of the barnyard goose, and before I was aware of the existence of goslings I shot the female. Then I took two of the goslings, that were about 2 weeks old, leaving the gander to rear the remaining six. The birds were on the nest at the time of capture. The nest itself was well-lined with grasses and placed near a pile of broken stone beside a marshy spot some acres in extent and about 100 yards from a shallow pond. On August 21, when again passing through the valley, I was happy to see the male proudly marching at the head of his family of six, at least 10 miles from the nest. As he had a broken wing and his family then had every indication of being able to shift for themselves, I reluctantly, and in the interest of science, dispatched him."

Of the arrival of these geese on their breeding grounds in northern Greenland, Ekblaw in notes quoted by Bent (1925) says: "June is almost gone when the first Snow Geese arrive in northwest Greenland. The land is almost bare of snow, the inland lakelets are open, and rushing streams are flush to the brim with clear, cold water. Spring is at its height when the Snow Geese come . . . The birds fly low and swift, their gleaming white plumage dazzlingly conspicuous against the dark-brown hills. When they fly near, the black tips of their wings are easily recognizable. They stalk regally about the lakelets and along the streams like the snow king's soldiers, stately and dignified. They are mated when they arrive in the North, and though they stay in flocks most of the time, they pair as soon as they alight, either on land or in water. Wherever they appear they grace the landscape."

Of the nests, eggs, and young of this species, the same writer, in his notes, states: "The geese nested in the grassy swales and flats along the lake-dotted flood plain of the streams which empty into North Star Bay [Greenland]. The nests are placed in depressions among the tussocks so that the brooding birds are not readily detected; built up somewhat with mud and grass and dead vegetation and lined with white feathers and down, they are much better constructed than are the nests of the Eider and the Old-squaw. The first eggs are laid soon after July 1. A

full clutch is 6 or 7 eggs. In about four weeks they hatch. The mothers and the young frequent the larger inland lakes until the young are able to walk and swim and dive fairly well, and then they take to the open sea. In late August or early September the fall molting season comes on. The geese then repair to the most remote and isolated lakes to be safe and free from disturbance while their wing feathers are renewed. At this time they are relatively helpless and the Eskimo find them easy prey. By mid-September the molting season is over and the geese leave at once." According to Witherby's Handbook the average size of the egg of this species is 3.21 by 2.17 inches.



Audubon (1840) says: "The flight of this species is strong and steady, and its migrations over the United States are performed at a considerable elevation, by regular flappings of the wings, and a disposition into lines similar to that of other geese. It walks well, and with rather elevated steps; but on land its appearance is not so graceful as that of our Common Canada Goose. Whilst with us they are much more silent than any other of our species, rarely emitting any cries unless when pursued or being wounded. They swim buoyantly, and when pressed, swim well. When attacked by the white-headed eagle, or any other rapacious bird, they dive well for a short space. At the least appearance of danger, when they are on land, they at once come close together, shake their heads and necks, move off in a contrary direction, very soon take to wing, and fly to a considerable distance, but often return after a time."

"In the autumn migration the first of the Greater Snow Geese to reach the feeding and nesting grounds at St. Joachim, Quebec, arrive there about September 12. Thereafter the birds continue to arrive gradually, in small flocks, for about a month, until all are present. On this autumn migration they are said to arrive at the Seal Islets, about twenty-five miles east of St. Joachim, some ten days before they are seen at the latter place. The first arrivals in the autumn are adults, and their numbers at St. Joachim are said to increase gradually to about 2,000 before any birds of the year are to be found with them. Whether or not these early-arriving adults are all or nearly all of the one sex is not known.

Later the birds often arrive in what appear to be family groups, which sometimes include two adults to the group, but often only one. After October 10, young birds form a majority of the assemblage. When the freeze-up causes the departure of these geese from St. Joachim in the autumn, they leave practically all together, generally by daylight, but sometimes at night" (White and Lewis, 1937).

Of the feeding habits of the Greater Snow Geese while on their winter grounds, Howard (1940) says: "On land they feed in the marshes, rarely in the sounds, but when they do go to open water, it is usually to rest or to escape molestation. . . . Feeding is done usually early in the morning or late in the afternoon. . . . also on bright moonlight nights. . . . The geese select a locality where, to quote the natives, the cord grass is 'belly deep on a cow.' Preferred spots seem to be where the grass is standing in a few inches of brackish or salt water. . . . Snow Geese do not graze, but drive their bills into the sand at the base of the grass or sedge and pull it out by the roots. After a few weeks of feeding in this manner what was once a grassy meadow becomes a shallow foul pool, completely devoid of vegetation.

"During the winter of 1937-38, Snow Geese denuded an area of approximately 300 acres on Pea Island [North Carolina]. How many years must elapse before these bare flats will again be clothed with sufficient vegetation to be used as feeding grounds depends upon a number of factors—the soil, wind erosion and water action. On Brodie Island there are wide, bare, windswept patches of sand where the geese have fed in past years. Some of these barrens are known to be four or five years old and yet show little or no sign of revegetation."

The Greater Snow Goose has never been held in high esteem as a game bird and its flesh is reputed to be not very palatable.

Blue Goose

Chen caerulescens

(Chen, se-ru-lés-enz, or ki-ru-lés-enz)

Colour Plate No. 4. Downy Young No. 32.

SCIENTIFIC NAME

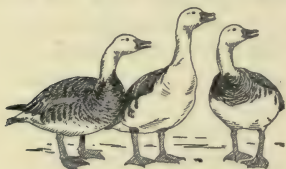
Chen, Greek, meaning a goose; *caerulescens*, Latin, meaning bluish.

COLLOQUIAL NAMES

IN LOCAL USE: Alaska goose; bald brant; black wavy; blue brant; blue wavy; brant; eagle-headed brant; gray brant; gray wavy; oie aigle (eagle goose) oie bleue (blue goose); outlaw; silver brant; skillet-head; white-headed goose.

DESCRIPTION

ADULTS, BOTH SEXES. *Head and neck*, white, with rusty stain suffused over face and cheeks, deepest in colour around base of bill; lower foreneck, dusky slate; *bill*, pink to reddish flesh, with usually a hint of dark orange near nostril, *nail*, white or pinkish white; broad, black "grinning patch" on sides of closed mandibles; *eye*, brown to dark brown. *Body*. *Back*, *scapulars*, *chest* and *sides*, dark greyish brown to blackish, with wave-like markings of cinnamon brown on edges and tips of feathers; in some specimens these vermiculations are paler, approaching an ashy colour; back always somewhat darker than underparts; *rump*, sometimes nearly pure white, sometimes blue grey; *breast* and *belly*, variable, in some specimens, like back but slightly lighter, in others ashy white, occasionally, immaculate white; between these extremes are intermediate blended variations; *flanks*, white; (those birds with white or whitish breasts may be found to be hybrids of the Blue Goose and the Lesser Snow Goose); *feet*, light purplish or pinkish red, more orange in autumn and winter; *claws*, black. (The bill and feet are indistinguishable from those of the Snow Geese.) *Tail* greyish brown to slaty, usually broadly tipped and edged with whitish; *upper and under coverts*, whitish, mottled with blue grey or greyish brown. *Wings*. All *coverts*, greyish blue, some of the inner lesser and middle coverts with black streak, the middle and greater edged with white, inner greater coverts, long and plume-like, black with broad, conspicuous margins of ashy to pale buffy white, varying to all white; *primaries*, black, greyish at base; *secondaries*, black, some edged with greyish; *tertials*, brownish black, with broad, conspicuous margins of ashy to pale buffy white, grey at base; *lining*, grey; *axillars*, whitish, finely speckled with greyish brown.



The breast pattern of the Blue Goose varies.

JUVENILE. In first autumn, very similar to adults except that *head and neck*, uniform light brownish slate, *chin*, white; *bill*, dusky; *back*, dark grey, with brownish feather-edgings; *underparts*, dull grey, almost whitish on *belly*; *feet*, dusky, with suffusion of pinkish. *Wing* like that of adult, except *lesser coverts* occasionally edged with brownish; *greater coverts* plain pale grey, inner, dusky, widely-margined

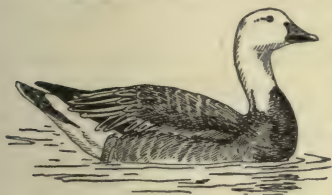
with whitish, shorter and less plume-like than those of adult; *primaries* and *secondaries* duller and browner black. *Tertials* either plain dusky brown or less conspicuously marked than those of adults.

During winter and spring the plumage matures rapidly by a continuous moult and, after the first summer moult, is fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A medium-sized goose, with dusky-grey and brown upperparts, and white head and neck. Chief distinguishing features (a) white head and neck, (b) pinkish bill, with broad black "grinning" patch, (c) greyish-blue wing-covert; inner greater coverts, long and plume-like.

The white head and neck, with dark body, separates the Blue Goose from all other geese; somewhat like the Emperor Goose, but that species has a black foreneck and lacks the "grinning" patch on bill.



JUVENILES. May be confused with juvenile White-fronted Goose but the latter species has yellowish feet and lacks the black "grinning" patch. See "Description."

FIELD MARKS

Winters on coast of Louisiana and migrates through Mississippi Valley, Manitoba and James Bay.



ON THE WATER. A medium-sized goose, readily identified by its white head and neck, and its dark body, features unique among geese and which are noticeable at considerable distance. The black foreneck of the Emperor Geese distinguishes that species.

IN FLIGHT. They fly in a broken mixture of V's, bars, curves and irregular lines; the white head and neck, and dark body make identification easy. On migration they are often found associated with the Lesser Snow Geese; the dark bird in the snow-white flock is invariably a Blue Goose.

VOICE. A high-pitched, *guop*; conversational, *ga-ga-ga-ga-ga*. The occasional clear whistle is the call of the young bird.

LIFE STORY

"The Blue Goose, while far from being the largest, is one of the most distinctive of the North American geese; this with its long-mysterious pilgrimages into unknown realms of the Arctic wilderness, lent to it an interest and charm in the minds of ornithologists unequalled by any other member of the family. Its characteristic markings—the dark body

with white head and neck, and pink to lilac feet and legs—render it easy and certain of identification in adult form. Once known it is never forgotten, nor confused with any other species” (Soper, 1930).

In the following words Bent (1925) aptly described the Blue Goose situation up to a recent date: “The Blue Goose is one of the few North American birds which we know only as a migrant and a winter resident, and within the narrowest limits. It has generally been regarded as a rare species, but it is really astonishingly abundant within the narrow confines of its winter home on the coast of Louisiana. Its apparent rarity is due to the fact that on its migration to and from this favorite resort it seldom straggles far from its direct route to and from its unknown breeding range. To find the breeding resorts of the Blue Goose is one of the most alluring of the unsolved problems in American ornithology. It is really surprising that such a large and conspicuous species, which is numerically so abundant, can disappear so completely during the breeding season.”

On June 26, 1929, however, J. Dewey Soper, acting under the direction of the Department of the Interior, Ottawa, Canada, discovered the nesting grounds of the Blue Goose, and so this outstanding hiatus in American ornithology was definitely filled. In a bulletin, “The Blue Goose,” issued by the Department of the Interior, Ottawa, Canada, Soper describes, in epic style, the event of his discovery, and unfolds a tale of Arctic exploration and polar research which is of absorbing interest. This “Life Story” of the Blue Goose is taken largely from Soper’s bulletin, and all quotations in this story are from Soper’s work unless otherwise designated.

The search for the breeding grounds of the Blue Goose lasted intermittently from 1923 to 1929. During this time by various means of progression directly and indirectly concerned with the work, an approximate distance of 30,300 miles was covered. The discovery is unique in that it was made as a “result of direct and intentional research, in contradistinction to fortuitous discovery as has been the case with many other polar species.” In the course of the search many places were visited—Ellesmore, Devon and Baffin Islands, as well as points in Greenland, Labrador and on the Hudson Strait coast of northern Quebec.

The Blue Goose was finally found nesting on a portion of the great western tundra of Baffin Island, the nesting area occupying a “comparatively narrow strip of low coastal plain on the eastern shore of Bowman Bay, Foxe Basin.” This district presents, “superficially at least, a polar panorama of far-reaching desolation; of vast, sodden marsh-lands bounded by the reeking mud flats and the everlasting ice of Foxe Basin; of a gloomy land, haunted by leaden skies and harassed by chilling gales of rain and snow. In such a land the young Blue Goose is born and raised to take his part in the long fall flight to the softer clime of his winter home on the coast of Louisiana.”

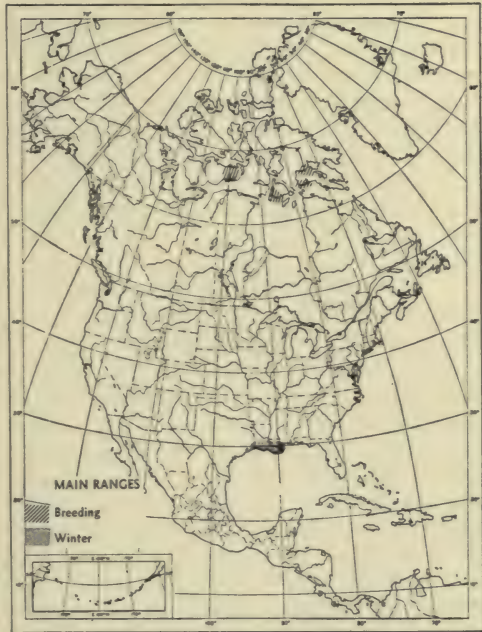
Another breeding ground of the Blue Goose was discovered in the spring of 1930 by G. M. Sutton, on Cape Kendal, Southampton Island,

Hudson Bay, five or six hundred miles to the westward of that found by Soper. Here, contrary to Soper's observations on Baffin Island, the Blue Goose and Lesser Snow Goose were found to interbreed occasionally. Gavin (1940) found two pairs of Blue Geese nesting on an island in a tributary of the Perry River.

The nests are built on top of slight undulations of the tundra. "This choice affords meagre elevation above the more sodden surroundings, with their muddy depressions and stagnant pools. Here the ground is comparatively dry and firm and well grown to moss and grass. Most of the nests are constructed of finely plucked and shredded moss, lined with a mixture of fine, dead grasses and light-coloured down. Others are built entirely of grass, or in combination with a species of chickweed . . . which thrives among it." The nests are large and bulky in relation to the inside diameter, and the eggs when freshly laid are white or very pale creamy white, averaging 3.16 by 2.01 inches. The shell is thick and finely granulated, with a slight sheen, or lustre. The number of eggs varies from 3 to 5, and the period of incubation is 23 to 25 days. The males stand by at the nest and, according to Soper, unquestionably take turns at incubation.

Manning (1942) states that the incubation period is 23 days, and says, "I have no evidence that the male ever incubates. All the birds that I collected after having seen them leave the nest were females, and I have never collected a male with the least indication of an incubating patch."

"Many herring gulls nest in the colony, chiefly on large glacial boulders. Whenever my passing disturbed a goose and caused it to leave its nest, a gull would soon swoop down to examine it, and, on seeing the eggs, alight close by. That, however, was usually as far as it got before the parent goose, most frequently the female which always kept a close watch about a hundred yards away, returned, quite oblivious of my presence, and alighting some yards from the nest, with flapping wings made a dash at the intruder. In its hurry it would often fall flat on its



breast. If geese have time, they cover their nests with down before leaving them, and unless the gulls see the eggs, they rarely trouble to investigate further. . . . It was not rare to see a herring gull's and a goose's nest within a few yards of each other. In this case there appeared to be a truce between the two parties; the gulls never attempted to take the goose eggs, and the geese did not try to drive away the gulls" (Manning, 1942).

"When alarmed at the nest, both male and female fly off close together, 'honk' loudly, circle the locality several times and then usually come down at a distance of 100 to 200 yards from the nest. . . . Actions of individuals, however, about the nest varied. Some remained sitting on the eggs until rather closely approached, others departed long beforehand, obviously more wary by nature. All would walk or fly to some little distance, whereupon they would anxiously strut about the tundra to watch developments. They invariably 'honk' noisily while an intruder is in the vicinity, and give vent to their feelings by repeatedly taking to the air in wide circles about the nest."

"The young of the Blue Goose are precocial and leave the nest shortly after hatching. They are exceedingly active and run with surprising rapidity and endurance when only a day or two old." As specimens of these were required, a landing was made by Soper's party near a point where a pair of Blue Geese were observed with five young. By the time the canoe had beached, the young goslings had run a distance of nearly 200 yards. The pursuers plunged along after them with difficulty in yielding moss and mud, and through shallow pools but did not overtake them until they had covered nearly half a mile. "The young were taken uninjured with the idea of bringing them out to civilization alive for a study of their growth and plumage change." They soon became very friendly and obviously enjoyed the warming effect of handling and "brooding" next to the body. The experiment of keeping them alive for transport to Ottawa quickly came to a tragic end; notwithstanding all precautions for their care, they "became sluggish and apathetic on the third morning after capture, and all died within a few hours of each other."

The instinct of fear in young geese is not "so much hereditary as acquired by example after hatching. At a very early age it is true that the young, when accompanied by the parents, are wild and make frantic efforts to escape from man. On the other hand, a few hours of association with the latter serve to quiet all apprehension, when they become exceedingly fearless and trusting. Strayed young, when taken into camp, soon lose their fear, quickly settle into a mood of complete contentment, and thoroughly enjoy being 'cupped' in the hands where the warmth soon lulls them to sleep. When released they would frequently make an effort to return to one's hands for a repetition of the comfort which they had lately enjoyed."

"Downy Blue Geese feed generously and drink freely and frequently; the latter is indulged in at the water's edge and while swim-

ming. Adult geese are voracious feeders, and the young soon following their example and requirements, develop at a wonderful rate. Thus, born after the middle of July, they are capable of short flights a little more than a month later, and participate in the commencement of the fall flight in early September. At this time they are practically full grown. From the little data available, they seem to increase their original weight at birth from sixteen to twenty times in the course of two months. At a corresponding rate of growth, the average human infant would weigh between 130 and 160 pounds when seven or eight weeks old."

The arrival of the Blue Geese on their breeding grounds in 1929 commenced on the 6th of June when large numbers of these birds passed over to the north and northwest during the day; the Blues were always in company with Lesser Snow Geese. "The heaviest migrational wave of the species occurred over the 14th and 15th of the month. This was more pronounced on the former date when, strangely enough, the birds travelled directly in the teeth of one of the severest northwest gales of the season; this appeared to tax their energy and tactics to the utmost. . . . On this day they flew low, sweeping in and out of valleys to take advantage of every hill that afforded any protection from the roaring gale." Associating with the mixed companies of Blue and Snow Geese were large numbers of Lesser Canada Geese and Brant migrating in the same direction. According to the records, the Blue Goose avails itself of about eleven weeks in the spring to make the 3,000 mile flight from Louisiana to the breeding range. If it so chose it "could easily make the entire flight in two weeks, or a little more . . . In the domestic economy of the species, however, it seems necessary to make the flight slowly and to recuperate largely at certain localities en route."

The same writer (1941) says: "The autumn migration from the eastern Arctic follows the east side of Hudson Bay, thence on a direct southwest course to the wintering grounds in Louisiana. The spring flyway, on the other hand, lies along, or somewhat west of the Mississippi River bearing almost due north to the spring rendezvous in southern Manitoba. From here the route turns almost at right angles toward James Bay, after which the northward flight to the breeding grounds follows the same route as the autumn journey. A feature worthy of note is that the spring migration route is longer than that of the autumn by approximately 600 miles."

Of the spring migration of the Blue and Lesser Snow Geese, and the stop-over of the flocks in the Province of



Manitoba, Soper (1941), says: "When this feathered tide sweeps in, it is as though some great torrent has been unleashed. A deluge pours into Manitoba—flock after flock, composed of myriads of individuals. With what eagerness they come, filled with an unconquerable urge to push northward! Accompanying this bold advance is a deafening clamour of wild voices thrilling with buoyant determination and high adventure. The movement continues day and night. Once momentum is gained, it never slackens until finally it comes to a temporary halt as the last of the multitudes rest and feed on the appointed meeting grounds. This great gathering of the clans of the plains chiefly west and northwest of Winnipeg continues for two or three weeks, or sometimes a month, according to season; then another stirring event takes place as the vast flocks, in successive groups, leave for James Bay and the Arctic. We believe that, just prior to this departure, southern Manitoba holds practically all the Blue Geese in existence, in addition to incalculable numbers of Lesser Snow and other geese. . . . There is in my possession a photograph taken west of Winnipeg of a distant mobilization of geese rising in a compact body from the ground. The entire flock was estimated to contain at least half a million geese, the great majority of which were Blues. . . . The Winnipeg district is evidently a focal point for these wild geese, whose flyways converge upon the middle of the continent during the migration from Louisiana to the Arctic."

While flying, as well as feeding, the Blue and Snow Geese are invariably noisy, their voices mingling with expressions of great variety. A hoarse 'honk' or a high pitched 'quack' is typical, while a familiar call . . . was an excited yapping or 'barking' almost similar to that of a small dog. This, with shrill, falsetto cries, was most commonly heard when large numbers held forth on their feeding grounds. One's general impression of these conclaves is that of a body given over to gossip and extreme sociability under the stress of great excitement."

By the time that the Blue Geese begin their nesting duties the numbers of associated Snow Geese have begun to diminish; they, with the Lesser Canada Geese and the Brants, disappear into the mysterious lands beyond the northern horizon. The theory that the Blue Goose was merely a colour phase of the Lesser Snow Goose was held for a long time, but Soper, after investigating the matter on the breeding-grounds, concluded that they are distinct species. The two species may interbreed occasionally, but in no single instance did he find a Blue and a Snow Goose mated with each other on Baffin Island. On migration the two species unquestionably co-mingle, and on the breeding grounds of the Blue Goose, Snows are found in association, but at Bowman Bay the ratio of Blues to Snows at that time is about 30 or 40 to 1. The main breeding grounds of the Snow Geese lie still further north.

These geese are voracious feeders. On their breeding grounds, "over large areas in valley bottoms and around ponds surrounded by grassy ground and tussocks, the birds so tore up the soil and herbage as to impart to the surface the appearance of having been intensely cultivated. Some grounds were almost denuded of vegetation Their chief food,

for which they grubbed deep in the soil, appeared to be the common tundra grass." While the plant life on their summer range is quite distinct from that of their winter resorts, their feeding habits in summer are very similar to those on their winter grounds as described by McAtee (1910) who says that in the Mississippi delta the Blue Geese rest by day on mud flats bordering the Gulf. At the time of his visit (January-February) "these were entirely destitute of vegetation, a condition to which the geese had reduced them by their voracious feeding. Every summer these flats are covered with a dense growth of 'cut grass,' 'Johnston grass,' and 'flag grass,' and every fall are denuded by the Blue Geese The birds feed principally upon the roots of these plants, but the tops of all are eaten at times, if not regularly. Each goose works out a rounded hole in the mud, devouring all of the roots discovered, and these holes are enlarged until they almost touch before the birds move on."

The autumn migration of the Blue Goose from the breeding range begins some time during the first half of September. At that time the tundra pools are beginning to freeze over and the first light snowfalls are temporarily mantling the tundra. It is quite probable that with the arrival and passing of the Snow Geese from their more northern grounds about the end of the first week in September, the Blue Goose multitudes join them to begin their southward flight. O. J. Murie in notes quoted by Bent (1925) says that the extensive salt-water marshes around the south and part of the west shore of James Bay furnish an excellent feeding place for the Blue Geese. "By September at least they begin to arrive in James Bay, and during this month and most of October they congregate in immense flocks, principally in Hannah Bay, at the extreme south end of James Bay The birds become extremely fat, sometimes bursting open in the fall to the ground when shot."

The Blue Geese winter chiefly on the coast of Louisiana. McAtee (1910) says: "The center of abundance of the species is a narrow strip extending along the coast of Louisiana from the Delta of the Mississippi to a short distance west of Vermillion Bay. To the eastward the bird is known only as a straggler, and to the west it diminishes gradually in numbers, being scarce on the extreme western coast of Louisiana and rare on the Texas coast."

In the conclusion of his bulletin on the Blue Goose, Soper says: "The habits of this bird are such that it congregates in large numbers, principally in two places: first, in its winter habitat in the region of the Mississippi Delta, and second, on its summer breeding ground on the western tundra plain of Baffin Island. . . . While I feel confident of the security of this notable game bird within the Canadian Arctic, and its ability to continue there free from serious molestation for an indefinite period, a doubt arises as to its chances for survival in the more southern regions which it occupies during the fall, winter and early spring. As very little is seen of the Blue Goose during its brief passage over the southern portion of the Dominion in fall of the year, the problem

of its perpetuation is largely one for the United States. If this is solved and the necessary measures of protection accorded, this magnificent species of our fauna will not perish from the earth but will continue to grace our landscapes, delight the eye of the nature-lover, and provide legitimate hunting to the sportsmen of the North American continent."

With reference to the occurrence of the Blue Goose with white bellies, Sutton (1931) says: "Almost every thorough account which has been written of the Blue Goose has included some reference to these white-bellied birds. At the famous feeding grounds of the species at the southern end of James Bay I personally saw many Blue Geese which were so much blotched as to merit the term "piebald". . . . All these birds with excess white in their plumage, I now believe to be hybrids. They do not, as I see it, merely represent extremes in a species which tends toward variableness in coloration. After all, among such species as the Blue and Lesser Snow Goose, where hybridism is known to occur, it is only logical to expect some noticeable external evidence of this hybridism in the progeny." Harrold (1928) says: "With regard to a possible explanation of the variability of the plumage of the Blue Goose, it is interesting to note that in the main line of flight of this species, the birds show little or no digression from the normal plumage, whereas at the western edge of their range, variations are common. In other words, if you see large flocks composed entirely (or nearly so) of the Blues, the probability is that they are uniformly typical in plumage but if small numbers of Blue are noticed in large flights of Lesser Snow, variations will predominate."

Ross's Goose

Chen rossii

(*Chen rossii*, of Peters)

(*Chen*, ros-i)

Colour Plate No. 5. Downy Young No. 32.

SCIENTIFIC NAME

Chen, Greek, meaning a goose; *rossii*, after Bernard R. Ross (1827-74), who was chief factor with the Hudson's Bay Co. and a correspondent of the Smithsonian Institution.

COLLOQUIAL NAMES

IN LOCAL USE: China goose; galoot; horned wavy; little wavy; scabby-nosed wavy; warty-nosed wavy.

DESCRIPTION

ADULTS, BOTH SEXES. Entire *plumage* snowy white, except *primaries*, black (four outer ones emarginate at tips), *coverts of primaries*, grey; *bill*, carmine red or pale purplish, with salmon tinge, edges, black; *nail*, white; upper mandible, corrugated, with warty protuberances near base; *eye*, dark brown; *feet*, dull reddish, *claws*, black,

JUVENILE. In first autumn general colour white, with brownish grey shading on *head*, usually forming line through eye to hind head, joining its fellow, and continuing down hindneck; *foreback*, brownish grey, with fainter shading on shorter scapulars; *wing*, same as adult, but some or all *secondaries* and *tertials* show greyish or brown on centres, and *primaries* mottled with whitish towards bases; *feet*, pinkish; *bill*, greenish, becoming pinkish throughout winter, no protuberances in adult. After first moult, during following summer, plumage fully adult.

SPECIMEN IDENTIFICATION

ADULTS. General effect: A very small, snow-white goose, with black wing-tips; the smallest of our geese, being about the size of a Mallard. Chief distinguishing features (a) white plumage, with black primaries and grey primary coverts, (b) reddish bill, with warty protuberances on base of upper mandible (c) very small size.

This species is identical in plumage with the Snow Geese but can be separated readily from these by its diminutive size, warty protuberances on bill and lack of black "grinning" patch. Features (a) and (b) will distinguish it from all other geese.

JUVENILES. Similar to juvenile Snow Goose but lack the black "grinning" patch on bill; lighter in general coloration. See "Description."



Showing warty protuberances on bill.

FIELD MARKS

(To be looked for, in winter, in the valleys of central California.)

ON THE WATER AND IN FLIGHT. A very small, snow-white goose. The field marks are the same as for the Snow Goose, of which this species is a replica in miniature, being about half the bulk of the Lesser Snow with which it frequently associates. It is much more silent in flight than its larger counterpart.

VOICE. The call is *luk-luk*.

LIFE STORY

The beautiful little Ross's Goose is the smallest of our geese, being about the size of a Mallard duck. Up to quite recently all that has been known of this little goose was gleaned during its brief winter sojourns in California. "Absolutely nothing seems to be known about its breeding habits in a wild state. Probably nothing will be known until some of the vast unexplored areas in the Arctic regions are better known. But these regions are so inaccessible that their exploration would involve more time, greater expense, and more enthusiasm than even the valuable re-



sults to be attained are likely to warrant. Therefore this and several other similar problems are likely to remain for a long time unsolved." So wrote A. C. Bent in 1925, and his words aptly described the situation up to 1940.

On July 1st, 1940 (Dominion Day), Messrs. Angus Gavin and Ernest Donovan, officials of the Hudson's Bay Company, solved the problem by the discovery of the nesting grounds of this little goose on a lake in a tributary of the Perry River, about 50 miles north of the Arctic Circle. The interesting discovery was first announced in "The Beaver," December, 1940. This magazine is published quarterly by "the Governor and Company of Adventurers of England trading into Hudson's Bay, commonly known as the Hudson's Bay Company," incorporated 2nd May, 1690.

John Cassin in 1861 named this bird Ross's Goose (*Chen rossi*) after Bernard Rogan Ross, Chief Factor of the Hudson's Bay Company, who sent him specimens from Fort Resolution, Great Slave Lake. Ross was born at Londonderry, Ireland, and a correspondent of the Smithsonian Institution.

In the issue of "The Beaver" that contains the announcement of the discovery of the breeding grounds of this goose, B. W. Cartwright recounts the unsuccessful attempts of the early Factors of the Hudson's Bay Company to locate the summer home of this species. Of the final effort he says: "The successful termination of the long search for the breeding grounds of Ross's Goose is due, in no small measure, to the well-known sportsman-naturalist E. F. G. (Ted) White of Ottawa. It was at the Wildlife Conference called by President Franklin D. Roosevelt at Washington in February, 1936, that Mr. White discussed the problem with R. H. G. Bonnycastle, representing the Hudson's Bay Company at the conference. White induced Bonnycastle to set the wheels of the great organization in motion, with the result so conclusively set forth in Gavin's and Donovan's narrative."



Of the actual discovery Gavin (1940) says: "It was the last day of June, 1940, when we set out from Perry River post, on Flagstaff Island, to look for the nesting grounds of the elusive Ross's Goose. As it was midsummer, the days were long—Perry River post being about seventy-five miles north of the Arctic Circle—and it was not until about four o'clock in the afternoon that we started out on the first leg of our journey across the sea-ice to the mouth of the Perry River . . . with Donovan and myself sitting in the middle of the canoe like factors of old, the natives dipped their paddles and we were off on one of the most delightful and thrilling trips it has been my pleasure to encounter in the North. The weather was perfect; each bend of the river brought new thrills. Ducks were everywhere, and the constant singing of the small birds, coupled with the harsher notes of the cranes and the honking of the geese, made sweet music.

"In a little while the rapids became faster, longer, and more frequent, until at last we came to one that proved to be about a mile long. After labouring up this we came to a mile or so of good water, and it was while we were on this calm stretch that the first Ross's Goose was sighted in the early morning light, flying towards the lake that lay ahead of us. Any doubts as to whether the geese we were looking for would be there certainly vanished when he appeared.

"On entering the lake, we could see them flying all over the place. . . . On the first three islands visited there were about fifty pairs nesting, anywhere from three to thirty feet apart The complete nest was about twelve inches over all, with a nesting cavity about five inches in diameter and about two and one-half inches in depth from the top of the downy rim. There were two to six creamy-white, ovate, eggs in the nest examined. Four eggs were the most common clutch noted. Some nests contained five eggs, some two or three, and one or two nests had six." The average size of the eggs is 2.74 by 1.90 inches. Some of the natives said that the Ross's Goose "was common thereabouts, the chief breeding grounds being on similar islands in a larger lake about six miles away."

It is most appropriate that the discovery of the Ross's Goose breeding grounds should have been made by officials of the Hudson's Bay Company. The honour of the discovery, however, nearly fell to Charles E. Gillham of the Fish and Wildlife Service, U. S. Department of the Interior. Gillham was first sent into the north to make studies of the status of migratory waterfowl in 1935, and continued his researches in each of the succeeding years. In 1938 he chartered a plane and actually flew over the Perry River, but ice conditions prevented the hoped-for landing. In his report of that year he stated: "From the air the writer could see countless large white birds in these marshes; whether they were Swans, Snow Geese, or Ross Geese only time will prove." In 1939 Gillham chartered a plane from Canadian Airways for a trip into the Perry River region but the sudden



death of the pilot caused the abandonment of the trip. In 1940, as related above, the nesting grounds of the little Ross's Goose were discovered by others.

"The path of migration of this goose seems to be different from that of any other species. It is a fair presumption that the principal route coincides with the districts in which the species is most common. The greater number pass from the breeding grounds to Great Slave Lake and Lake Athabasca, continue south to central and western Montana, and then turn southwest, cross the Rocky Mountains, and pass to central and southern California" (Cooke, 1906). "Thus, instead of turning to the southeast, to winter on the Gulf coast with the other eastern geese and ducks which have been traveling companions, the Ross Goose parts company with them at the national boundary line, and goes southwest across the Rocky Mountains to California" (Grinnell, Bryant, and Storer, 1918).

An instance of the former abundance of these geese is given by Williams (1886), who, regarding a flock he saw on a bar in the Missouri River, says that they "presented a rather remarkable sight, consisting as it did of several thousand individuals squatting closely together along the edge of the bar. Here and there birds were constantly standing up and flapping their wings, then settling down again, all the while a confused gabble, half gooselike, half ducklike, arising from the whole flock. We approached to within a hundred yards or so, when the geese lightly arose to a considerable height and flew off over the prairie, where they soon alighted and began to feed on the short, green grass. While flying, often two or three birds would dart off from the main flock, and, one behind the other, swing around in great curves, quite after the manner of the little chimney swift in the East."

The flesh of this goose is highly esteemed, and before the prohibition of market shooting large numbers of these geese were sold on the markets in California.

RIVER AND POND DUCKS

OR

SURFACE-FEEDING DUCKS

Subfamily *Anatinae*

Common Mallard

Anas platyrhynchos platyrhynchos
(á-nas, pla-ti-ring-kos)

Colour Plate No. 6. Downy Young No. 33. Hybrids No. 36.

SCIENTIFIC NAME

Anas, Latin, meaning a duck; *platyrhynchos*, from Greek *platys*, meaning broad, and *rhynchos*, meaning beak.

COLLOQUIAL NAMES

IN GENERAL USE: Greenhead; greenhead mallard; mallard; mallard duck; wild mallard. IN LOCAL USE: Black duck; canard franis (French duck); canard gris (grey duck); common wild duck; English duck; French duck; frostybeak; gibier gris (grey fowl); green mallard; grey duck (female); grey mallard; ice-breaker; ice duck, ice mallard, frosty-beak, snow mallard, twister, yellow-legged mallard, and ringneck; snow mallard; sookie (female); stock duck; susies (females) twister; wild drake; wild duck; yellow-legged mallard; yellowlegs. (NOTE.—The names ice-breaker, ice duck, ice mallard, frosty-beak, snow mallard, twister, yellow-legged mallard, and yellowlegs, are all applied to late migrants previously thought to be a variety distinct from the early autumn birds.)

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, rich iridescent green, with purplish gloss in certain lights, terminating at base of neck in narrow white collar, incomplete behind; *crown*, blackish green; *bill*, yellow, sometimes dusky on ridge, earlier in season olive or greenish yellow, about as long as head; *nail*, black; *eye*, brown to dark brown. *Body*. *Chest*, rich purple chestnut, almost meeting on lower hindneck, feathers with lighter edgings which tend to wear off towards spring; *back*, brown, darker in middle; *scapulars*, greyish white, outer ones chestnut brown, all finely vermiculated with dusky; *rump*, glossy black with bluish-green reflections; *sides*, *breast*, *belly* and *flanks*, white, finely vermiculated with dusky, producing silvery-grey effect; *feet*, bright reddish orange or yellowish, earlier in season, duller reddish orange. *Tail*, brownish grey, outer feathers mostly white, central ones broadly edged with white; upper and under *coverts*, glossy black, middle feathers of upper coverts curled upwards. *Wings*. All *coverts*, brownish ashy, *greater coverts* white toward ends but tipped with black; *primaries*, greyish brown, darker at tips; *secondaries*, with *speculum* of iridescent purplish blue, bordered in front and behind with black and white bars and inwardly with black; *tertials*, long and broad, grey sometimes tipped with whitish or buffy, chestnut brown on outer webs, varying to dusky with olive tinge, and sometimes with very little chestnut; *lining* and *axillars*, white.

ECLIPSE PLUMAGE: The moult into the eclipse starts in early June or July, and is usually complete in August, when the plumage closely resembles that of the

somber, mottled female, except that the bill is dull olive green without spotting. The full eclipse plumage is worn for about one month, during which time the full-plumaged wing is renewed.

AUTUMN PLUMAGE: Early in September, the male commences a continuous moult out of the female-like plumage of the eclipse, into the full winter plumage. By early October, the *head* shows a considerable amount of green, and new finely vermiculated feathers show among the *scapulars*; plain brown feathers appear on the *back*, and some black ones on the *rump*. The *chest*, *breast*, and *sides* begin to take on the general pattern of the full winter plumage, but in varying degree, the buffy-brown feathers of the eclipse plumage still predominate; the *bill* is olive green and the *feet*, dull reddish orange, with darker webs.

In later stages, the green of the *head* is completed, the buffy-brown feathers lingering longest on the *cheeks*; the white *neck-ring* becomes noticeable and the full plumage of the *back*, *scapulars* and *rump* is assumed; the *bill* becomes more yellowish and the *feet* a brighter orange red, losing the dusky on the webs. Finally, the last of the buffy-brown feathers disappears from the *chest*, *breast* and *sides*. Some birds regain their full plumage in October, some not until November or even later.

ADULT FEMALE. *Head* and *neck*, buff, streaked with brown, more darkly and heavily streaked on *crown*; *cheeks*, paler; *chin* and *throat*, buffy, without streaks; dark streak through eye, and sometimes another dark streak extending backwards from gape; *bill*, orange to greenish olive, with brown or dusky on ridge, spotted with darker, about as long as head; *nail*, dusky; *eye*, dark brown. *Body*. Entire body variegated and streaked with dusky brown and tawny, having yellowish-brown edges to the feathers; *back* and *scapulars*, most heavily marked; feathers of sides of *chest* show distinct buffy and also brown U-shaped markings (lacking in juveniles of both sexes); *breast* and *belly*, lightest; *feet*, pale orange red. *Tail*, greyish brown, darker in middle, pale, almost whitish on margins; *upper coverts*, same as back; *under coverts*, whitish, streaked like belly but with heavier dark markings. *Wings*. Same as in male, but *coverts* sometimes slightly browner and with paler feather edgings.

JUVENILE. **AUTUMN PLUMAGE:** By September, the plumage of both sexes resembles that of the adult female, but is darker and more brownish, especially on *back* and *chest*, feathers of chest lack central markings of chest-feathers of adult female; *breast* and *belly* streaked with brown. Young male shows vermiculated feathers on *flanks*. Young males are larger than young females, and have larger *bills*, lacking spotting of female bill. From this time on sexes differentiate rapidly by an almost continuous moult. By December both sexes have practically assumed adult plumage, though highest development of plumage is not acquired until following year. Autumn moult of young male follows same sequence as that of the adult male out of eclipse, but green of *head* is taken on more slowly, and female-like feathers of *back*, *chest* and *sides* persist longer. *Wing of Male*. As in adult male, but *tertials*, shorter, duller, and less suffused with chestnut brown; *greater coverts* usually have narrower white tips. *Wing of Female*. As in adult female, but *tertials*, shorter, browner, and more broadly edged with buff.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A large, strikingly-marked and beautiful duck, with green head and neck, chestnut-red chest, and silvery-grey body. Chief distinguishing features (a) hind toe without lobe, (b) green head and

neck with white collar, (c) speculum bordered in front *and* behind with white bars, (d) middle, upper tail-coverts curled upwards.

It is practically impossible to confuse the full-plumaged male with any other species.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A large duck, with entire plumage mottled brown. Chief features (a) hind toe without lobe, (b) speculum bordered in front *and* behind with white bars, (c) bill, orange and dusky, (d) tail, very pale or whitish.

The two white bars to the speculum separate the female Mallard from all other Surface-feeding Ducks except the New Mexican Duck, which is almost identical but somewhat darker in colour. The bill of the male New Mexican has the upper mandible bright yellow instead of orange and dusky; the female New Mexican Duck has a bill similar to the female Mallard's but is distinguishable by its darker colour and heavier streaking of the underparts. (See New Mexican Duck for description of distinctive markings of breast-feathers of that species.) The other River and Pond ducks whose plumage is mottled brown all over are the Black Ducks, the Florida and Mottled Ducks, and the female Pintail. The specula of these ducks, however, lack the *two* pronounced white bars of the Mallard.

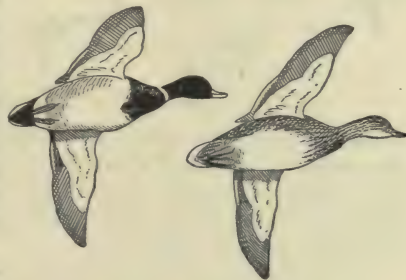
FIELD MARKS

ON THE WATER. A large duck; the male is readily recognized by its greyish body, offset by dark head, neck,

chest and hindquarters; the white neck-ring and the white bars of the speculum are sometimes noticeable. The female is one of several mottled-brown ducks, but is paler than the others; the whitish tail and the *two* white bars of the speculum are distinctive. The speculum is, however, a poor identifying feature of a sitting duck as the feathers of the sides usually cover that part of the wings.



IN FLIGHT. Not particularly rapid; the head and neck are carried pointing slightly upward; the body appears large and the wing spread is ample. These ducks spring from the water with a bound, rising vertically into the air for several feet before leveling off for flight. In flight the foreparts and hindquarters of the male appear dark, the breast and underwing surface show white, and the two white bars of the speculum are very evident. The female can be identified on the wing by the *two* white bars of the speculum and the white underwing surface. The female Pintail is similar, but its neck is longer, tail more pointed and the white wing-bars and white wing-lining are lacking.



VOICE. A very vociferous bird, especially the female, which quacks loudly, particularly when on the feeding grounds. The female has a loud resonant *quack*, and the male a low reedy quack, *kwek-kwek-kwek-kwek*, but of extraordinary carrying power. The "feed" call is *tick-a-tic-a-tic-tic-tic*. The voices of both sexes resemble those of the Black Duck.

LIFE STORY

Of all ducks, the one that is of the greatest importance to man is, unquestionably, the Mallard. For thousands of years the wild Mallard has furnished mankind with countless tons of food and the domesticated variety has provided us with vast quantities of eggs, flesh and feathers. The Mallard lends itself readily to domestication and is the progenitor of nearly all our domestic breeds. In China, with its tremendous population, the flesh and eggs of this splendid duck form an important part of the country's food supply.

No one country or even continent can claim the Mallard for its own; it inhabits almost the whole of the Northern Hemisphere, and among the ducks is probably the most abundant species. In North America it is found across the continent, though it is much more prevalent in the western portion, giving place in the East to the Black Duck. Much overlapping occurs, however, and both species are common in the interior. The Mallard crosses freely with other species, especially with its near relative, the Black. The offspring of these two are usually fertile. Crosses with the Gadwall, Pintail, Baldpate, Green-winged Teal and other species are also known. See Colour Plate No. 36.

In the spring during late February and early March the hardy Mallards, leaders in the migrating hordes of wildfowl, leave their winter homes in the Southern States, follow closely the footsteps of retreating winter and arrive at the northern limits of their breeding range in Alaska early in May. In the autumn, flights from local nesting areas to nearby feeding grounds start in late August or early September, but the main migration flight does not begin in earnest until late in September, "when the first early frosts, the brilliant hues of ripening leaves and the falling crop of acorns and beechnuts remind them of advancing autumn. But the waning of the harvest moon and the crisp, clear nights of early October also remind the hunters of the glorious sport of duck



shooting; in the stillness of the night they push their flat skiffs out through the watery lanes among the acres of reeds and buckrush to the shallow ponds, overgrown with smartweed and wild rice, where the ducks are wont to feed; their wooden decoys are

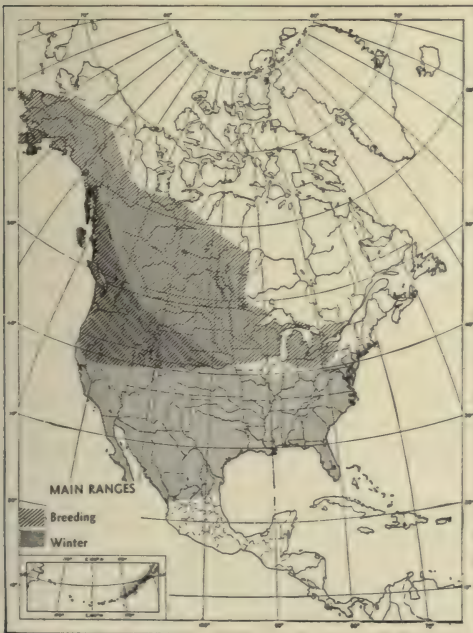
anchored in some conspicuous open space and their skiffs are carefully concealed in blinds of thick reeds and grasses, where they patiently await the coming daylight, listen for the quacking notes of the awakening ducks and watch for the passing flocks on the way to their feeding grounds" (Bent, 1923).

The main winter home of the Mallard is in the lower half of the Mississippi Valley south of the line of frozen ponds, and in the Gulf States from Texas to Florida. Here it lives and flourishes mainly in fresh water ponds, swamps, streams, everglades, and rice fields, fattening

on the abundant food found in these havens of our wildfowl. Its winter range, however, is a wide one, and the hardy Mallard will winter even in the far north provided it can find open water; it is found wintering off the coasts of Alaska and the Aleutian Islands, in the brackish water at the outlets of the lakes and streams near the sea coasts.

"When the Mallard drake courts, he swims restlessly about, following or sidling up to a duck. She may lead him quite a chase before she vouchsafes to acknowledge his presence, although he is continually bowing to her, bobbing his head up and down in nervous jerks so that the yellow bill dips into the water for a quarter of its length and comes up dripping. He also rears himself up in the water and from time to time displays his breast. She occasionally turns her head to one side and carelessly dabbles her bill in the water, but sooner or later, if all goes well, she begins to bow also, less vigorously at first—not touching the water at all—and to the empty space in front of her. Suddenly she turns and the pair bow to each other in the same energetic nervous jerks, and, unless a rival appears to spoil the situation, the drake has won his suit" (Townsend, 1916). Often, courtship is conducted largely on the wing. Bent (1923) writes that as many as three males may be seen "in ardent pursuit of one female, flying about, high in the air, circling over the marshes in rapid flight and quacking loudly; finally the duck flies up to the drake of her choice, touches him with her bill, and the two fly off together, leaving the unlucky suitors to seek other mates."

The Mallard generally builds its nest on or near the edges of prairie ponds or sloughs where the ground is dry or only slightly marshy. It does, however, often nest in the open prairie, frequently at long distances from any water. The nest itself is usually a hollow in the ground, well concealed, and lined with broken flags, reeds or convenient material from the immediate vicinity, and also with down and feathers from the mother's breast. Normally only one set of eggs is laid each season and the number may range from 6 to 15 but the usual clutch is from 8 to 10. The eggs vary in colour from light greenish buff to light greyish buff and average 2.27 by 1.64 inches in



size. The Mallard often lays its eggs in the nests of other ducks but is perhaps less addicted to this habit than many others, the Redhead for example. In heavily wooded districts nests of the Mallard may be found in trees sometimes as high as 25 feet from the ground. Such sites are usually in the unused nests of hawks in the forks of trees and are not in cavities in the trunks or branches as are those of the regular tree-nesting species.

The female incubates the eggs unassisted. This duty requires from 23 to 29 days, usually 26. As Bent (1923) says, "The drakes usually take no interest in family cares after the eggs are laid, but gather in small flocks by themselves, moult into eclipse plumage and hide among the rushes in the sloughs where they spend the summer in seclusion." Our imaginative artists in their pretty pictures of family groups of Mallards, invariably depict the Mallard drake in full winter plumage, accompanying the female and their brood. This is, of course, entirely wrong and very misleading; the drake at this time is skulking by himself and, in his eclipse moult, is far from being an object of beauty.

Of the mother's care of the young, Bent (1923) says: "The watchful mother is ever on the alert, and at the approach of danger gives her note of alarm which sends the little ones scattering in all directions to hide in the underbrush or thick grass, while she diverts the attention of the intruder. She is very courageous in the defense of her young; I once surprised a female with her brood in a little pond hole in the timber; although the young were well hidden in the surrounding grass and bushes, the old bird was flapping about, within a few feet of me, splashing and quacking loudly, frequently rising and circling about me, then dropping into the pond again and showing every symptom of anxiety, totally regardless of her own safety; the young were too well concealed for me to find them and I left the anxious mother in peace."

The principal feeding grounds of the Mallard are the shallow waters of sloughs, ponds, lakes, and rivers of the interior but it is also particularly partial to wheat, barley, corn, and buckwheat which it gleans from the stubble fields on every opportunity. Its food is nine-tenths vegetable. An examination of the stomach contents of 1,578 of these ducks, taken in 22 States and 2 Canadian Provinces, showed the following approximate percentages: sedges, 22; grasses, 13; smartweeds, 10; pondweeds, 8; duckweeds, 6; coontail, 6; wild celery and its allies, 4; water elm and hackberries, 4; wapato and its allies, 4; acorns, 2; seeds of buttonbush, 2; cypress cones and galls, 1; miscellaneous plant food, 9; total vegetable food, 91 per cent. Insects, 3; molluscs, 6; total animal food, 9 per cent. Some of the stomachs were interesting on account of the large numbers of individual objects they contained. For instance, one revealed about 28,160 seeds of a bulrush, 8,700 of another sedge, 35,840 of primrose willow, and about 2,560 of duckweeds as the principal items, a total of more than 75,200 seeds. Another stomach contained no fewer than 102,400 seeds of primrose willow, which number of seeds, if sowed one foot apart each way, would suffice for $2\frac{1}{2}$ acres of ground. The Mallard is one of

those ducks which are prone to gorge themselves on the rotting flesh of salmon in the rivers of the Northwest.

Referring to acorns which are shown to form an appreciable part of the diet of this duck, McAtee (1918) says: "Mallards sometimes resort to woods where they can obtain acorns, and occasionally a bird takes so many that it is unable to fly. In connection with acorns it is appropriate to mention hickory nuts, contained in 96 Mallard gizzards. These hard nuts might be thought beyond the powers of a duck to digest, but, on the contrary, they are taken care of with ease, being broken by the great pressure exerted by the gizzard as they are on the point of entering that organ. Once wholly within they quickly are ground to fine fragments." A similar instance is recorded in the "Life Story" of the Wood Duck, which also appears to have no difficulty in disposing of the equally hard nuts of the bitter pecan.

The Mallard is a great destroyer of mosquito life. The following is condensed from an article which the late Dr. S. G. Dixon, while Health Commissioner of Pennsylvania, published in the *Journal of the American Medical Association*, in 1914: Two dams were constructed on a stream so that the ponds would present exactly the same conditions. One was stocked with goldfish and in the other 20 Mallards were allowed to feed. After a short time the duck pond was entirely free from mosquitoes while the fish pond was teeming with young insects in different cycles of life. The well-fed Mallards were then admitted to the infested

pond, where they soon recognized the presence of larvae and pupae of the mosquitoes and immediately turned their attention to these, ravenously devouring them in preference to any other food present. At the end of 24 hours no pupae were to be found and in 48 hours only a few of the larvae survived. He adds: "For some years I have been using ducks to keep down mosquitoes in swamps that would have been very expensive to drain, but I never fully appreciated the high degree of efficiency of the duck as a destroyer of mosquito life until the foregoing test was made."

(Author's Note: There is no doubt that ducks are great



destroyers of mosquito life but the foregoing quotation hardly does justice to the efficiency of fish in this regard as goldfish are largely vegetarian in their feeding habits and, therefore, do not afford a good comparison.)

Like most Pond Ducks, the Mallard springs vertically into the air from land or water and flies directly away in a strong, well-sustained flight. It is not recognized as one of the fastest of fliers, but the greatest migration speed, recorded up to 1935, for a banded bird is that of a Mallard, banded on November 23rd, 1930, in Green Bay, Wisconsin, and shot five days later, 900 miles away, near Georgetown, S. C. "This bird doubtless flew at least 1,000 miles in the 5 days, as its route probably was not in a direct air line, but, even so, the average daily distance was only 200 miles, which could easily have been covered in five hours" (Lincoln, 1935). Mallards have been timed in flight by aeroplanes and found to be traveling at speeds of 46, 50, 55, 58 and 60 miles an hour.

There are many records which establish a definite "homing" instinct in ducks, of which the following is an outstanding example. Lincoln (1934) says: "A classic illustration of the return of an adult duck to its nest site of the previous year is the Mallard that carries Biological Survey band 555414. Banded in November, 1927, at a game refuge near Antioch, Nebraska, this duck has returned every year since and has occupied the same nesting site, which, curiously enough, is a box on the roof of a barn. This bird is known to have produced more than one hundred ducklings, many of which have been banded. Thus far there has been no evidence that a single one of these young birds has returned to nest even in the State where it was hatched, though individuals of the broods have been recovered south to Arizona, Texas, and Louisiana, and north to Alberta." A footnote adds: "This duck returned to the refuge on February 4th, 1934, and remained all summer but failed to breed. In 1933 she produced a complete set of 'runt' eggs which apparently marked the final effort of her ovaries."

The handsome Mallard is an active, wary bird and its large size, abundance, and excellent table qualities place it high on the list of the game birds of the world. It is a prime favourite of gunners everywhere, decoys well, and is probably the most sought after of all ducks. In the West, sportsmen recognize two varieties of Mallard, the larger yellow-legged kind and the smaller red-legged bird. Regarding this, Roberts (1909) says: "The birds that furnish the early fall shooting are smaller and lighter in weight, with darker bills and plainer plumage than those that come later. Hunters are inclined to consider them a different species, but they are only the young and the imperfectly molted adults of the more southern-breeding birds. The later, larger, and more handsome ducks, with yellow bills and orange-colored legs, are those breeding farther north, that are farther advanced in the molt and better conditioned. The flight of 'big northern mallards,' so called by many duck-hunters and eagerly awaited in the fall, is not, therefore, made up of a different kind of mallard, but only a heavier feathered, better fed, more perfectly dressed bird than the earlier ones. Most of our ducks do not fully re-

cover from the summer eclipse plumage until very late in the fall or early in the winter, so that they are rarely seen in the most perfect and resplendent plumage, now that spring shooting has been abolished." The later arrivals are known locally throughout the West by such names as "ice mallard," "yellow-legs" and several others, to distinguish them from the earlier arrivals.

Market hunting is now prohibited and the rapid extermination of our wildfowl through this agency has fortunately been checked. Nevertheless, the following examples of the former slaughter of the Mallard by market hunters will be of interest, and are fair examples of the toll which used to be levied on many other species. Cooke (1906) writes: "Big Lake, Arkansas, was and still is one of the favorite resorts, and during the winter of 1893-94 a single gunner sold 8,000 Mallards, while the total number sent to market from this one place amounted to 120,000." Forbush (1909) says: "In 1900 I visited a gunning preserve in Florida where northern sportsmen were shooting ducks by the hundred and giving them away to their friends and to settlers. One of these gentlemen, armed with repeating guns and supplied with a man to load and others to drive the birds to his decoys, is said to have killed, on a wager, over 100 ducks in less than two hours. Even within the last two years reports of reliable observers on the Gulf coast aver that market hunters there have been killing 100 birds each per day."

New Mexican Duck

Anas diazi novimexicana

(á-nas, deé-az-i, no-vi-mex-i-ká-na)

Colour Plate No. 8

SCIENTIFIC NAME

Anas, Latin, meaning a duck, *diaz*i, in honour of Sr. Augustin Diaz, Director, Mexican Geographical and Exploring Commission, 1886; *novimexicana*, from Latin, *novus*, meaning new, and *mexicana*, meaning of Mexico, thus, of New Mexico.

COLLOQUIAL NAMES

Not known.

DESCRIPTION

ADULTS, BOTH SEXES. WINTER PLUMAGE: Practically identical with female Mallard, differing as stated below.

ECLIPSE. AUTUMN AND JUVENILE PLUMAGE: The sequence and extent of these plumages are similar to those of Black Duck. *Breast* feathers of juveniles of both sexes show breast-feather markings similar to adult female, as described below.

SPECIMEN IDENTIFICATION

ADULT MALE. General effect: A large, mottled-brown duck. Chief distinguishing features (a) hind toe without lobe, (b) speculum bordered in front and behind with black and white bars, white bar in front sometimes mixed with dusky or buff,



Breast feathers of New Mexican Duck. Left, Male. Right, Female.

(c) bill and nail, greenish yellow, (d) darker in coloration than female Mallard, and more heavily marked below, (e) breast-feather shows central U-shaped marking.

ADULT FEMALE. General effect: A large, mottled-brown duck. Chief distinguishing features (a) hind toe without lobe, (b) speculum, bordered in front and behind with black and white bars, white bar in front, sometimes marked with dusky or buff, or in some cases entirely lacking, (c) bill, dusky on ridge, brilliant orange on sides, with black nail, (d) darker in coloration than female Mallard and more heavily streaked below, (e) breast-feathers show terminal dusky dot,

and central dusky bar.

The speculum will separate both sexes from the other mottled-brown ducks, namely, the Black, Florida, and Mottled Ducks, which lack the white bars in front of, and behind the speculum, and from the female Pintail.

FIELD MARKS

Same as for the female Mallard, from which it can be separated in the field by its much brighter-coloured bill and by its somewhat darker coloration; lacks white tail of the Mallard. Often found in association with Mallards. The New Mexican Duck is seldom encountered outside its restricted range.

LIFE STORY

The following account of the New Mexican Duck is condensed from an article by Wharton Huber, in Bent (1923).

"In the valley of the Rio Grande River from El Paso, Texas, north to Albuquerque, New Mexico," this duck makes its home. "Whether on the mud flats in the river, the numerous alkali ponds, or cat-tail swamps through the valley, this duck is ever watchful and wary of man.

"During the months of April and early May, 1920, I watched the courtship of several pairs of these ducks along the Rio Grande River. . . . Two, three, and sometimes five, New Mexican Ducks could be seen on the mud flats in the middle of the river, as often with flocks of Mallards as alone. When with a flock of Mallards they would stay together and not mix with the former. The male could be seen bowing to the female and occasionally pecking and pulling at her wing feathers. When on the water the male would swim close to the female he had chosen, generally behind her, swim close up and pull at her feathers quacking all the while. If another (presumably a female) came too close he would swim rapidly at the intruder until she was driven to a safe distance. Returning to his prospective mate he would bob his head up and down a number of times quacking contentedly. Early in May these ducks were evidently mated as they were always seen in pairs or single birds. . . .

"While watching a pair of the ducks on a mud flat in the middle of the Rio Grande River . . . I witnessed a very interesting performance. Both ducks took flight simultaneously, rising in the air at an angle of about 30 degrees. They were flying slowly, their wings seeming to raise higher than in ordinary flight, both quacking incessantly. . . . Making a

large circuit over the land, the male all the while keeping his position directly above the female, they swung again over the river, coming head up into the light wind, whereupon they set their wings and descended to the water, the female slightly in the lead. Immediately upon alighting copulation occurred.

"The nest and eggs of the New Mexican Duck, so far as I know, still remain to be described. Although I hunted almost daily during the last half of May and the first half of June, I was not successful in locating a single nest." From the end of July on, "flocks of from 10 to 25 young accompanied by old females could be seen feeding along the river bank. Even at this age they were extremely wary, and one could get within range only by the greatest stealth and stalking.

"The feeding habits of this species are similar to the Mallard. They feed among the river banks, in the drainage canals, ponds, and cat-tail swamps. In the spring the flooded alfalfa fields are favorite grounds for food. Ever extremely wary, they pass much of the daytime on the mud flats in the middle of the river. At dusk they seek their favorite feeding grounds, a cat-tail swamp or flooded alfalfa field, even though it lie close to a ranch house or small settlement. The food I found to consist of green shoots of alfalfa and cat-tail, grass roots, corn, wheat, and numerous small fresh-water shells, together with the larger seeds of weeds and grasses.

"The flight of the New Mexican Duck is similar to that of the Mallard, but it is a stronger and somewhat faster flyer. It was during the very heavy wind storms lasting two or three days that occur in March in southwestern New Mexico, that I noticed the greater strength of flight of this species over the Mallard. One could easily distinguish an individual of this species in a flock of Mallards by its darker colour and conspicuous pyrite yellow bill.

"While feeding in the ponds and flooded alfalfa fields it keeps a short distance away from the other ducks. Food is obtained in the deeper water by thrusting the head straight down and keeping the body nearly submerged by the use of the feet, the tail only standing straight up above water. I have never seen this duck dive even when wounded. Several times while



hunting with decoys on some of the larger ponds, combined flocks of Mallards and New Mexican Ducks would alight a hundred or more yards beyond the decoys. Ever wary and suspicious, the New Mexican Ducks would feed by themselves and never venture nearer the decoys, while the unsuspecting Mallards would soon be swimming in and out amongst the wooden ducks."

Black Duck

(1) RED-LEGGED BLACK DUCK

Anas rubripes rubripes.

(á-nas, róob-ri-pees)

(2) COMMON BLACK DUCK

Anas rubripes tristis.

(á-nas, róob-ri-pees, trís-tis)

Colour Plate No. 7. Downy Young No. 33. Hybrids No. 36.

SCIENTIFIC NAME

Anas, Latin, meaning a duck; *rubripes*, from Latin *ruber*, meaning red, and *pes*, meaning a foot; *tristis*, Latin, meaning sad, sorrowful; referring to the subdued colouring of its feet in comparison to those of the Red-legged Black and partly, Brewster states, "to commemorate the sad fate it has been called upon to suffer at the hands of authorities on nomenclature."

COLLOQUIAL NAMES

Red-legged Black Duck. IN GENERAL USE: Black Duck; black mallard; often shortened to black or blackie. IN LOCAL USE: Black English duck; black-jack; blue-winged duck; brown duck; brown mallard; canard noir (black duck); English duck; gibier noir (black fowl); ledge duck; Labrador duck; mallard; marsh duck; nigger duck; old winter duck; outside duck; redleg red-legged duck; red-paddle; sea duck; summer duck; velvet duck; winter black duck.

COLLOQUIAL NAMES

Common Black Duck: IN GENERAL USE: Black duck; black mallard; often shortened to black or blackie. IN LOCAL USE: Beach duck; black English duck; blackjack; blue-winged duck; brown duck; brown mallard; canard noir (black duck); canard noir d'hiver (winter black duck); English duck; gibier noir (black fowl); mallard; marsh duck; nigger black duck; nigger duck; pond black duck; spring black duck; summer black duck; summer duck; velvet duck.

The Black Ducks are divided by the A.O.U., in the 1931 Check List, into two subspecies as above. The popular conception of the two forms of Black Duck is as follows: The RED-LEGGED BLACK DUCK is distinguishable by its coral-red feet, yellow bill, heavier feathering, and larger size. It is presumed to be the more northern breeder and the later migrant. The COMMON BLACK DUCK is designated as the smaller bird with brownish or olive feet, and greenish bill. It is said to be the more southern breeder and the earlier migrant.

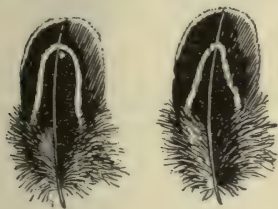
There are many who do not agree that the Black Duck should be divided into varieties. Those who hold against the division of the Black Ducks into two subspecies maintain that the Red-legged Black is merely the older, more fully developed

bird, and that the differences which exist between the two forms can be accounted for by differences of age, sex, and moult. The oft-repeated arguments for and against the division of the Black Ducks into two subspecies are summarized in the "Life Story" below.

In the following "Descriptions" the two forms of Black Ducks are dealt with conjointly, and slight but distinct and noticeable differences in the plumages of the sexes are noted.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: (*Attention is called to the fact that the plumage of this fully adult bird conforms to that which is generally ascribed to the Red-legged Black Duck; note especially the colours of the bill and feet.*)



Feathers from sides of chest of adult male Black Duck in winter plumage.

Head and neck, lighter than rest of body, creamy whitish, streaked with dusky; *crown*, dusky, feathers edged with lighter; a dusky streak from base of bill through eye; (area at termination of dusky streak, and area on sides of head at rear often show green iridescence); *chin and throat*, usually streaked with dusky; *bill*, yellow, with olive tinge, almost orange yellow in older birds, occasionally, as in female, ridge is marked with dusky; *eye*, brown to dark brown. *Body*. *Upper back, scapulars, chest, sides and rump*, dusky brown, with creamy white or buffy feather-edgings; *lower back*, with fewer, narrower, pale feather-edgings; feathers of *chest*, particularly those of *sides of chest*,

with central, U-shaped buff markings (these markings are V-shaped in female); feathers of *upper sides*, with reddish-buff stripe on upper web, or with reddish-buff U-shaped marking, usually incomplete at apex of U; *feet*, orange red to coral red. *Wings. Coverts*, same as scapulars; *primaries*, dusky, lighter on inner webs; *secondaries*, with purplish-blue *speculum*, bordered in front and behind with black bars, and often narrowly tipped behind with white; *tertials*, dusky gray, edged with buffy grey, outer ones, black on outer web; *lining*, silvery white; *axillars*, white, sometimes with dusky brown along shaft.

POSTNUPTIAL OR ECLIPSE PLUMAGE: This plumage is acquired by a moult which usually commences in May or June. The eclipse plumage resembles the winter plumage except (a) the feathers of the sides of the *chest* and of the *sides* are plain dusky, without the U-shaped buff markings or stripes of the winter plumage, (b) the light feather-edgings tend in general to be narrower, (c) the *bill* and *feet* are much duller in colour than when in full winter plumage. The annual moult of the wing-feathers takes place during this moult. (The eclipse male, illustrated on Plate No. 7, was shot on July 11, 1940, at Fort Severn, Ontario, on Hudson's Bay.)



Feather from side of chest of male in eclipse plumage.

AUTUMN PLUMAGE: In September the adult male commences a moult of the body feathers, tail, and tertials, discarding the plumage of the eclipse for the full winter plumage. The new feathers of the *sides of the chest* appear with their U-shaped markings. The colours of the *bill* and the *feet* progressively brighten to the more vivid colours of winter. The full winter plumage is usually complete by the end of October. (*Note that by the end of October, when the moult is practically complete,*

the adult male is in the plumage recognized as that of the Red-legged Black Duck, but that earlier in the season, in the preliminary stages of the moult, the colours of bill and feet more closely resemble those ascribed to the Common Black Duck.)

ADULT FEMALE. WINTER PLUMAGE: (*Note that this description of the female, particularly in respect to the colour of the bill and feet, conforms to that which is usually ascribed to the Common Black Duck.*) Female closely resembles male in winter plumage except (a) feathers of sides of chest have pointed, V-shaped buff markings, which, however, may be lacking in some birds (these marks are rounded or U-shaped in male), (b) bill generally shorter, and greener or more olive yellow than that of male; usually a dusky blotch on ridge and often small black spots on sides of upper mandible (in a very few old females bill may be plain yellow and may lack dusky markings), (c) feet brownish, with usually some orange or salmon colour; some older females have feet as brightly coloured as juvenile male in late autumn; colour of feet shows great variation.



Feathers from sides of chest of adult female Black Duck.

POSTNUPTIAL PLUMAGE: This plumage is acquired by a moult which may commence as early as March or April; it resembles the winter plumage except (a) feathers of chest are plain dusky without V-shaped buff markings on centers, (b) feather-edgings tend in general to be narrower. Annual shedding of wing-feathers takes place during this moult. During a second moult from September to October this plumage is replaced by winter plumage, described above.

JUVENILE. (*Note that this plumage, particularly in respect to the colours of the bill and feet, conforms to that usually ascribed to the Common Black Duck.*)

By the beginning of September sexes are much alike and resemble adults except (a) sides of feathers of chest and breast widely margined with buff, but dark center of feathers reaches to tip, giving very streaked appearance to *underparts*. All body-feathers narrower than in adult, (b) U-shaped or V-shaped markings on feathers of sides of chest, present in adult, are lacking, (c) less contrast between colour of head and neck, and colour of rest of body, (d) tail-feathers narrower, with usual blunt structure (fig. 26), (e) bill of young male in early autumn yellowish olive. (Colour change of bill takes place very shortly after death); bill of young female at this time dusky or olive grey, with blackish spots on upper mandible, (f) feet of young male orange brown; feet of young female brownish, sometimes with olive tinge.



Chest and breast feather of juvenile.

From September to November inclusive, juveniles undergo a continuous moult of body-feathers, tail and tertials, during which juvenile plumage described above is progressively replaced by first winter plumage, similar to that of adult. The narrow body-feathers, with the broad buffy side-edging, are gradually replaced by wider, completely buffy-edged feathers, and the U-shaped or V-shaped ones of the adult chest-plumage are acquired. Bill of young male gradually changes from yellowish olive to yellowish, approaching orange yellow of adult by January. (Colour change of bill takes place very shortly after death.) Bill of young female changes very gradually from dusky towards the yellowish

olive of maturity. *Feet* of young male change from orange brown to salmon or orange red by January. *Feet* of young female change from brownish to brownish with some orange or salmon colour by mid-winter. The juvenile *wing* is not moulted until the first postnuptial moult during the following summer. Except for the wing, plumage is practically adult by December. *Wing of Both Sexes.* Like that of corresponding adult, but *greater coverts* have narrower, and less distinct, dusky tips; *tertials*, smaller more rounded at tips, browner and duller; three outer *secondaries* show less iridescence, and all *secondaries* narrower.

The conclusion that may be drawn from the foregoing descriptions is that the differences which exist between the two forms of Black Ducks are due entirely to age, sex, and moult, and that:

(1) The bird generally known as the Red-legged Black Duck, taken by gunners in the *late* autumn, is a full-plumaged adult male or an old female.

(2) The bird generally known as the Common Black Duck, taken by gunners in *early to mid*-autumn, is either (a) an adult male emerging from the summer moult, (b) an adult female, or (c) a juvenile.

(The colour change in the bill and feet of the Black Duck, as it progresses toward maturity, is paralleled in the Mallard. In the Mallard, however, it has been long recognized that these variations are due to age, sex, and moult.)

SPECIMEN IDENTIFICATION

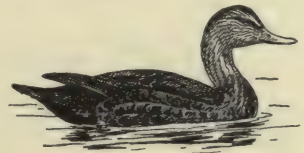
BOTH SEXES. General effect: A large duck, with the entire plumage dark mottled brown. Chief distinguishing features (a) hind toe without lobe, (b) bright purplish-blue speculum, bordered in front and behind with black bars, (c) bill, see "Description," (d) feet, see "Description," (e) crown, dark; head and neck, creamy white, uniformly streaked with dusky.

The Black Duck may be distinguished from the other mottled-brown ducks of this subfamily as follows: The Florida and Mottled Ducks have yellow-orange bill with black spot at base; throat and chin are light buff with few streaks; feathers of back have broader, more cinnamon-buffy edges. The New Mexican Duck and the female Mallard have prominent white bars in front of and behind the speculum. The female Pintail has a pale speculum, with cinnamon or buffy-white border in front, blue-grey feet and more pointed tail.

JUVENILES. See "Description."

FIELD MARKS

ON THE WATER. The sexes are alike; the appearance is that of a very large, sooty-black duck, with head and neck noticeably paler; general coloration darker than that of female Mallard. They swim lightly gracefully, and at considerable speed. The absence of the *two* white bars of the speculum, and the absence of white in the tail will separate individuals from female Mallards. On the Atlantic coast in winter they may, in the distance, be confused with Scoters, which are also large black ducks but have stouter heads and shorter necks. The restricted range of the New Mexican, Florida, and Mottled Ducks, which are very similar to the Black, will minimize confusion with this species.





IN FLIGHT. Swift and direct, usually high in the air, with long necks outstretched; generally in small flocks of not more than a dozen birds in V-shaped formation or long, single, sloping line. They are easily recognized by their large, very dark bodies in combination with the silvery sheen of the underwing surface. They alight on the water with a gentle gliding splash and, when taking flight, spring vertically upward for 8 or 10 feet before leveling off.

VOICE. The female has a loud resonant *quack*, like that of the Mallard; the male, a low, reedy, short *quek*. Like the Mallard, the female is noisy, and the voices of the two species are practically identical.

LIFE STORY

The splendid Black Duck, which is the equal of the Mallard in every respect except beauty, is confined in its range to the eastern and central portions of North America, in most of which it far outnumbers all other species of fresh-water ducks. Were it not for the abundance of this species, the gunners of the East would fare badly, as that part of the continent lacks the great diversity of wild fowl found in the West. In spite of being heavily shot at, the Black remains plentiful and the sad tale that can be told regarding the diminution of the erstwhile numbers of many other species does not apply in the case of the Black.

The Black Duck is the most sagacious, wary, and wildest of all ducks, and even in captivity it retains its shyness and distrust of man. When the shooting season commences the locally bred young birds are not difficult to take but even they soon learn their lesson and become as wild as the wildest. They are distrustful of decoys and their keen eyes soon detect the slightest movement of the hunter behind the blind; the gunner must exercise every caution to be successful. The meat of the Black Duck ranks just as highly as that of the Mallard.

"The Black Duck starts into flight, from land or water, by a powerful upward spring, rising perpendicularly 8 to 10 feet into the air before it starts away in its swift and direct flight. When once under way its flight is strong and swift, usually high in the air, unless forced by strong adverse winds to fly low; its long neck is outstretched and its wings vibrate rapidly, the white underside of the wings flashing in the light and serving as a good field mark at a long distance. When descending from a height to alight in a pond the pointed wings are curved downward and rigidly held, as the smooth body



glides through the air, tipping slightly from side to side, gradually dropping in a circle until near enough to check its momentum with a few vigorous flaps and drop into the water, feet first, with a gentle, gliding splash. On land the Black Duck walks with ease and grace, running rapidly, if necessary, and holding its head high. It is ever on the alert and can seldom be surprised. It swims lightly and gracefully and with some speed. It does not ordinarily dive, but it can do so, if necessary, as every gunner knows who has wounded one and chased it. I have read that this duck can detect the presence of danger by the sense of smell, but I doubt it; it would not come so readily to well-concealed duck stands, where human beings are living constantly, if its nostrils were very keen. I should think it more likely that it depends on its sight and hearing, both of which are very acute and highly developed" (Bent, 1923).

Of the courtship of this duck, Sawyer (1909) says: "Most interesting were the actions of one pair that, from the time the flock came, constantly raced from end to end of the pond, one bird closely pursuing the other. Now and again the chase became too hot, and the leading bird in a thrilling swirl of water rose several feet into the air, followed immediately by the other. Toward the farther end of the pond they would splash into the water, soon to take wing again in the opposite direction. As, with necks stretched far out and downward, the pair flew half the length of the pond—2 or 3 rods—while the other ducks looked quietly on or went indifferently about their feeding, making the water dance till it seemed alive with ducks, the scene was really spectacular. Again and again, I heard the pair of ducks break from the water, and the splash, splash as they dropped into the pond again." Bent (1923) says: "I have often seen the spirited nuptial flight of this species. Near some woodland reservoir I have heard the loud quacking notes and, looking up, have seen a pair, or perhaps, three, of these ducks flying over the tree tops at full speed; the courtship chase seems to be a test of speed and energy, a sort of aerial game of tag, as they sweep around again and again in a large circle or back and forth over the pond or swamp which they will probably choose for a summer home; finally the bride yields to the suitor of her choice and they fly off together or drop down into the water."

As these words are being written, on the verandah of the log cabin at the Glen Major Angling Club, about 40 miles northeast of Toronto, Ontario, there are two broods of young Black Ducks with their mothers swimming around in the Upper Pond less than 100 yards away. Every year Blacks breed in this little sanctuary and the nests are usually built among the willows and cat-tail (*Typha*) on the edges of the same pond or the marsh adjoining which carries a thick growth of horse-tail (*Equisetum fluviatile*). At 2 p.m. on May 24th, 1942, however, while angling for trout (*Salvelinus fontinalis*) on the Lower Pond of this club, I came upon a nest located on the top of an old stump standing in the water, about 25 feet from the nearest bank. The top of the stump was about 2

feet above the level of the water. Small shrubs growing around the edge of the rotting wood, formed a canopy over the nest which completely guarded it from view. Although other anglers and I had fished this pond frequently from the 1st of May, and had approached within 30 feet of the site, the nest had remained undiscovered, so well was it concealed. On examination, the nest was found to contain four ducklings out of the shell, three partly out, two eggs pipped, and one egg unpipped (afterwards found to be addled). It was raining steadily at the time, but a friend, camped in the vicinity, was impressed into service with his camera, and several snapshots were taken. As the light was failing rapidly and the rain increasing in intensity, it was decided to return in the morning to take additional photographs. Accordingly at 8 a.m. the following day, the nest was re-visited and in it were nine fluffy, lively little downies. The mothers was nowhere in sight and, as the light was still poor, operations were deferred for an hour. A foolish mistake! When we returned at 9 a.m. the nest was empty and, though the pond was small, with no reeds or marsh at any point in which they might hide, the mother and youngsters had vanished; the most diligent search of the entire shoreline failed to disclose their hiding place.

Bent (1923) says: "The Black Duck nests in a variety of situations and does not seem to show any preference for any particular kind of surroundings provided it can find sufficient concealment. This makes it one of the hardest ducks' nests to find, for one never knows where or how to look for it and can only happen upon it by chance; I have spent many hours hunting for it in vain, around the edges of swamps or grassy meadows, along the shores of ponds, in thickets of underbrush, or even in the borders of the woods near such places The first nest I found was in the Magdalen Islands It was in the center of a little islet or 'nubble' in a small pond hole in the East Point marshes, a favorite breeding place of this and other ducks. The nest was prettily located and well concealed in a thick clump of tall dead grass; the hollow on the ground was lined with dry grass and only a little down, as the eight eggs that it contained were fresh; as with other ducks, more down would be added as incubation advances." Very occasionally Black Ducks nest off the ground; Beaupré (1906) found them nesting in trees on a small island in the St. Lawrence River. He says: "a pair of these ducks had taken possession of an old crow's nest, and on the date of discovery had laid 10 eggs. The nest was saddled on the limb of a large elm 45 feet from the ground." The second nest was "in a last year's nest of the red-shouldered hawk in a basswood tree 50 feet up." The usual number of eggs is 8 or 10, but the clutch may vary from 6 to 12. The eggs are a pale greenish-buffy shade and are very much like those of the Mallard; the average size is 2.34 by 1.70 inches.

Unevenness in distribution results in the Black Duck feeding more extensively than the Mallard in salt marshes and other areas characteristic of the coast region. In such places animal food, such as molluscs and crustaceans, is abundant and contributes more to the sustenance of ducks

than is the case in inland waters. Accordingly, the Black Duck consumes almost three times as much animal food as the Mallard; the actual percentages contrasted, are, respectively, 24 per cent and 9 per cent. An examination of the stomachs of 390 of these ducks, collected in the six months from September to February, and from 19 States and 2 Canadian Provinces, showed the following approximate percentages: pondweeds, 32; grasses, 11; sedges, 11; smartweed, 5; seeds of burr reeds, 3; seeds of water shield, water lilies, and coontail, 1; miscellaneous plant food, 13; total vegetable food, 76 per cent. Molluscs and shellfish, 12; crustaceans, 8; insects, 2; fishes, 1; miscellaneous animal food, 1; total animal food, 24 per cent. While the food of this duck during the months stated above is only about three-fourths of plant origin, during the summer and autumn its food is nearly nine-tenths vegetable, as shown by the analysis of the stomach contents of 25 of these ducks shot in autumn in Massachusetts. The principal items of food of this group were: seeds of burr reed, pondweed, bulrush, eelgrass, and mermaid weed; buds, rootstocks, etc., of wild celery. Total vegetable matter, 88.4 per cent. The animal matter in order of importance consisted of snails, ants, larvae, bivalves, crustaceans, and insects. Total animal matter, 11.6 per cent. In the autumn Blacks resort to grain fields and feast on wheat, barley, and buckwheat; they visit the woods to enjoy acorns and beechnuts, and farther south fields of rice provide a substantial part of their diet. Knight (1908) says that he has known these ducks "to so gorge themselves with huckleberries in late August that they would go to sleep under the bushes near the water, and one which I started from under my feet in this condition when I too, was after huckleberries, was unable to fly, it was so gorged, but it managed to scramble into the water and swim away, disgorging itself until finally able to rise and fly away, all the time quacking incessantly."

The following is a condensed version of a plan, described by Bent (1923), that is typical of the murderous methods that used to be employed to destroy ducks in Massachusetts and other states: On the shore of a pond frequented by migrating waterfowl was built a



permanent camp, known as a "duck stand," at which one or more gunners lived constantly all through the shooting season. This consisted of a small house or shanty equipped with sleeping bunks for several men, a stove for cooking and heating, and shutters to prevent the lights showing through the windows at night. Along the shore was built a fence or stockade in which portholes were cut so that several men could shoot through it without being seen. The house and fence were completely covered with leafy branches which rendered the whole structure practically invisible from the lake. A large supply of live decoys, semi-domesticated Black Ducks, Mallards, and Canada Geese were enclosed in the water or allowed to roam about. With all this elaborate equipment ready for action, the gunners, hardly to be called sportsmen, spent their time inside the house playing cards, etc. One man remained on the watch for ducks. Should a flock appear, they would all take their places at the portholes with heavy guns ready for the slaughter. Each gunner knew at which section of the flock he was to shoot when the signal was given to fire. If the affair had been well managed, most of the flock was killed or disabled, but as the frightened survivors rose in hurried confusion a second volley was poured into them and only a few escaped.

In autumn the first flights, which consist mainly of the younger birds, commence early in September, at about the same time as the flight of the Blue-winged Teal. Through autumn the flight increases in volume and in the size of the flocks, though the Black never does fly in very large flocks. In spring the latter part of March sees them on their way back to the ponds and streams of yesteryear and to family cares. In winter, when the last of the ponds and swamps of the interior has frozen, the Blacks are forced to the sea coast, where they spend most of the day riding in safety well out from shore, or, if the sea be rough, in the lee of ledges, in little coves, or in the bays. In the evening they return to the marshes, ponds, and mud flats of the vicinity to feed during the night.

THE SEPARATION OF THE BLACK DUCK INTO TWO SUBSPECIES

In 1902 William Brewster described the Red-legged Black Duck, and divided the Black Duck into two subspecies. Controversy has raged on the question ever since and the matter, in the opinion of many, has not yet been satisfactorily settled.

The arguments for and against the separation of the Black Duck into two subspecies may be summarized as follows:

ARGUMENT FOR

Most sportsmen and many naturalists affirm that the physical differences of the two varieties considered in conjunction with their entirely different habits and behaviour, definitely establish the subspecific standing of the two Black Ducks.

The physical differences which are claimed to exist between the two kinds of Black Ducks are: **COMMON BLACK DUCK:** Smaller bird,

with olive or brownish feet and olive bill; more difference in size between sexes than in the Red-leg. **RED-LEGGED BLACK DUCK:** Larger bird, with a yellowish bill and coral-red feet; more rugged and with heavier feathering; more prominent white tipping to feathers of the greater coverts, which feature is either entirely lacking or very much less evident in the Common Black; females more nearly the size of males than in the Common Black.

The differences in habits and behaviour claimed to exist between the two Blacks are: **COMMON BLACK DUCK:** (a) Earlier migrant, with a more southerly breeding range, (b) migrates as early as mid-September, or at least shifts from breeding grounds to better feeding grounds, (c) less shy, (d) decoys more readily to live decoys, (e) more loquacious, (f) less nocturnal in feeding habits, (g) on the coasts in winter less inclined to spend the day on open ocean, (h) prefers fresh and brackish water food, (i) feeds in both fresh water ponds and salt meadows. **RED-LEGGED BLACK DUCK:** (a) Late migrant, with a more northerly breeding range, (b) shows greater resistance to cold weather, (c) more wary, (d) more silent, (e) seldom decoys even to live decoys, (f) when flocks do decoy, they alight at a safe distance and approach very cautiously with necks erect, and keep less closely together than Common Blacks, (g) on the coasts in winter more frequently sit offshore in rough seas, (h) seldom resorts to small ponds, but chooses the larger sheets of open water near the ocean to which it resorts to drink but not to feed, (i) prefers marine food.

ARGUMENT AGAINST

On the other hand, many prominent ornithologists and some sportsmen maintain that the Black Duck should not be divided into two subspecies for the following reasons:

(a) The differences which exist between the two forms are exactly those which distinguish old birds from young. (b) They point to the case of the closely related Mallard of which two kinds are recognized: the later migrant, a larger bird, heavier feathered and having orange coloured feet and yellow bill, and the earlier migrant, a smaller bird, with red feet and darker bill. It is conceded that the later migrant is merely the older bird, better fed and more fully recovered from the effect of the summer eclipse moult. From this parallel it is inferred that the same holds good in the case of the Blacks. (c) They point to many other instances among the ducks where young birds habitually migrate earlier than the old. (d) On the question of the darker feet and bill of one variety it is claimed that all juvenile Blacks have dark feet, including those from points farthest north which are supposed to lie within the breeding range of the Red-leg; and that all adults after the breeding season and during the eclipse moult also assume the duller colour of feet and bill, which parts progressively become more vivid in colour coincident with the development of the full plumage late in the autumn,

reaching fullest development in the latest migrants—the so-called Red-legs, (e) They point out that the soft parts (bills and feet) of many ducks show seasonal changes of colour and changes of colour due to age. (f) The white tips of the greater coverts, the generally heavier feathering, the greater average weight, points which are characteristic of the Red-leg, they claim are nothing more than indications of maturity. (g) The difference in the habits of the two forms is attributed to the shyness, wariness, and wildness which are the natural outcome of experience which accompanies maturity. (h) To have any standing, a subspecies must be shown to have a distinct breeding range, which they assert has not been established in the case of the Red-leg. The vague generalization that it is a more northern breeder does not constitute a delimitation of a clearly defined breeding range.

Dr. Miles D. Pirnie made an exhaustive study of this species, and was the first to describe the two annual plumages, and to point out the differences between the male and the female plumages. He was unable to find any evidence of two different races in the Black Duck, and concluded that the subspecific characteristics which other authorities had used were due to sex, age, and moult. The earlier migrants, usually regarded as the Common Black Duck, were, he found, birds in immature plumage or adults still in their postnuptial moult; many of these latter, having completed the moult would, a few weeks later, show the characteristics of the Red-legged Black Duck. He found also that there was a great deal of variation between birds of equal age, and even between birds of the same brood.

Florida Duck

Anas fulvigula fulvigula

(á-nas, ful-víg-u-la)

Colour Plate No. 8. Downy Young No. 33.

SCIENTIFIC NAME

Anas, Latin, meaning a duck; *fulvigula*, from Latin *fulvus*, meaning tawny, reddish, and *gula*, meaning throat.

COLLOQUIAL NAMES

Probably the same as for Mottled Duck.

DESCRIPTION

ADULTS, BOTH SEXES. WINTER PLUMAGE: Practically identical with Black Duck, though somewhat smaller and differing as stated below. Feathers of sides of *chest* of male show central U-shaped buffy marking; similar feathers on female show central buffy streak.

ECLIPSE AND AUTUMN PLUMAGES: Same as those of Black Duck.

JUVENILE. Similar to Mottled Duck.

SPECIMEN IDENTIFICATION

ADULTS, BOTH SEXES. General effect: A large, mottled-brown duck. Chief distinguishing features (a) hind toe without lobe, (b) speculum, variable, from green with strong purplish gloss to almost solid purple, bordered in front and behind with black bars, and often narrowly behind with white, (c) chin and throat, and often cheek below eye, pale buffy without streaks, (d) bill of male, bright yellow or yellow orange, nail and line along base of ridge and spot at base of bill, black; bill of female, dull orange, with blackish spots, and black spot at base, (e) broad, paler edges to feathers of back, (f) feet, brilliant orange to orange red, duller and slightly more orange in female.

From the other mottled-brown ducks it is separated as follows: Female Mallard and New Mexican Duck have prominent white bars in front of and behind speculum though white bar in front of speculum in New Mexican Duck is sometimes buffy or indistinct, or may be entirely lacking. Its near neighbour, the Mottled Ducks, has somewhat more heavily-streaked cheeks, chin and throat, and black spot at base of bill is less distinct. Female Pintail has blue-grey feet, long thin neck and pointed tail. From the Black Duck it is told by features (c) and (d), and by having a much paler general coloration of body due to broader, paler edges to the feathers. The Florida Duck usually has white tips to the secondaries, which, also, is frequently the case with the Black.

JUVENILE. See Mottled Duck.

FIELD MARKS

Same as those of Black Duck, except for general coloration of body plumage which more closely resembles that of female Mallard. The Florida Duck is seldom encountered outside its restricted range.

LIFE STORY

The Florida Duck is abundant in the southern and central portions of Florida. Here it finds sanctuary in the dense tangle of vegetation and impenetrable saw-grass sloughs surrounding the extensive marshes of the St. John's River, where it feeds, breeds, and successfully conceals itself from its enemies.

The species was first described by Ridgway in 1874, when it and the Mottled Duck were together separated from the Black or Dusky Duck as it was then known. Later the Florida and the Mottled Ducks were shown to be distinct subspecies, the latter form being restricted to Louisiana and Texas.

The Florida Duck closely resembles the Black Duck in appearance and habits, and in life is hard to distinguish from it, especially so as it shows in flight the same white wing-lining against the dark body, a mark so distinctive of the Black Duck. It is less shy than the Black, probably because it is not so systematically hunted. Closely allied as it is to both the Mottled and the Black Duck, it is not known to cross with either.

The food of the two subspecies, the Florida and the Mottled Ducks, is here dealt with conjointly. It is interesting to note that these ducks



consume a higher percentage of animal food (41 per cent) than do any of the other Surface-feeding Ducks, the Shoveller following with 34 per cent. An analysis of the contents of 48 stomachs of these two varieties gave the following approximate percentages; Grasses, 29; smartweeds, 10; seeds and tubers of sedges, 6; lilies and coontail, 3; seeds of pondweeds and widgeon grass, 2; miscellaneous plant food, 9; total vegetable matter, 59 per cent. Molluscs, 27; insects, 8; crustaceans, 3; fishes, 3; total animal food, 41 per cent.

The nest is always on the ground, usually near water but frequently as much as 300 yards away. It is formed of grass and other material with a rim of down from the

mother's breast. Placed under a palmetto or other sheltering bush or canopied by the standing grass, the eggs are not visible from above. The usual clutch is from 8 to 10 eggs, similar to those of the Black Duck, creamy or greenish white in colour and averaging 2.24 by 1.74 inches.

Since the Florida Duck occupies its restricted range in both winter and summer and there is no migration, it is not of general interest to the gunners of this continent. It receives adequate attention in this regard from local nimrods, however, and a toll large enough, if not too large, is taken of these birds in the hunting season.

Mottled Duck

Anas fulvigula maculosa
(á-nas, ful-víg-u-la, mak-u-ló-sa)

Colour Plate No. 8. Downy Young No. 33.

SCIENTIFIC NAME

Anas, Latin, meaning a duck; *fulvigula*, from Latin *fulvus*, meaning tawny, reddish, and *gula*, meaning a throat; *maculosa*, Latin, meaning spotted, stained.

COLLOQUIAL NAMES

Canard noir d'été (summer black duck); southern mallard.

DESCRIPTION

ADULTS, BOTH SEXES. WINTER PLUMAGE: Practically identical with the Black Duck though somewhat smaller and differing as below. Feathers of sides of *chest* have markings similar to those of Florida Duck.

ECLIPSE AND AUTUMN PLUMAGE: Same as those of Black Duck.

JUVENILE. By early autumn plumage of both sexes closely resembles that of adult though *speculum* of young male is not only duller but occupies less area than that of adult. Feathers of sides of *chest*, of both sexes, have markings as in adult female. During late autumn and winter the progress towards maturity is rapid and by spring plumage is adult except for wings. Plumage is fully adult by second autumn.

SPECIMEN IDENTIFICATION

ADULTS, BOTH SEXES. General effect: A large mottled-brown duck. Chief distinguishing features (a) hind toe without lobe, (b) purplish *speculum*, bordered in front and behind with black, and sometimes narrowly behind with white, (c) cheek, finely streaked with dusky markings extended to base of bill, usually some streaking on chin and throat, (d) bill, same as in Florida Duck, but spot at base less distinct, (e) broad, paler edges to feathers of back.

From other mottled-brown ducks it is separated as follows: the female Mallard and the New Mexican Duck have black and also white bars in front of and behind the *speculum*—though in New Mexican species the white bar in front may be indistinct or lacking. Its near neighbor the Florida Duck, has pale buffy cheeks, with streak-



ing less and rather finer than that on the cheeks of the Mottled Duck, and has almost no streaking around base of bill, on chin or throat. The Mottled Duck is darker in tone over the whole body than is the Florida. From the Black Duck it is told by its broader, more cinnamon-buffy edges to the back feathers and by feature (d) above; both species frequently have white tips to the secondaries.

JUVENILES. See "Description."

FIELD MARKS

Same as those of Black Duck, except for general coloration of body plumage which more closely resembles that of female Mallard. The Florida Duck is seldom encountered outside its restricted range.

LIFE STORY

The Mottled Duck occupies, in both winter and summer, a restricted range in the States of Louisiana and Texas. In all its habits and in its appearance it is similar to its near relative and neighbour, the Florida Duck, and to its close relative, the Black Duck.

It was considered identical with the Florida until Sennet in 1889 called attention to the characters which separate the twain into distinct subspecies; when the darker, Mottled Duck, was subspecifically named *maculosa*.

It builds the same carefully concealed nest as does the Florida and the eggs of the two are alike except that those of the Mottled are slightly smaller; the average size being 2.16 by 1.59 inches.

In Louisiana it is called Summer Black Duck to distinguish it from the true Black Duck which winters there in large numbers and is known locally as the Winter Black.

Gadwall*Chaulelasmus streperus*

(Kou-le-láz-mus, stré-pe-rus)

Colour Plates Nos. 10 and 11. Downy Young No. 33. Hybrid No. 36.

SCIENTIFIC NAME

Chaulelasmus, from Greek, *chaulios*, meaning protuberant, *chauliodous*, meaning having protrusive teeth, and *elasmus*, meaning a layer, a plate, referring to teeth of bill; *streperus*, Latin, meaning noisy.

COLLOQUIAL NAMES

IN GENERAL USE: Cadwall (also spelled gadwell, gadwale, sometimes shortened to gaddy); grey duck. IN LOCAL USE: Blaten duck; canard gris (grey duck); chicka-cock; chickcock; creek duck; glissom duck; grey widgeon; prairie mallard; redwing; shuttlecock; specklebelly; widgeon.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head*, with low *crest*, pale brownish or grey, marked with small dusky streaks and dots; *crown*, darker, sometimes washed with chestnut; *neck*, pale brownish, finely streaked with dusky, darker on hind-neck; *chin* and *throat*, buffy or whitish, usually lightly flecked with brownish; *bill*, bluish black, with usually trace of dull orange at base and along edge, shorter than head; *eye*, reddish brown to dark brown. *Body. Back*, *scapulars*, *sides* and *flanks*, dusky, finely vermiculated with buffy or whitish, longer scapulars narrow and pointed, dusky, with cinnamon-orange margins; *chest*, greyish black, with whitish or buffy crescent-markings, giving a scaled effect; *rump*, black with slight greenish gloss; *breast*, white, with faint dusky marking at rear; *belly*, white, mottled with faint dusky; *feet*, bright orange yellow, with blackish webs. *Tail*, brownish grey, narrowly edged with whitish; upper and under *coverts*, glossy black. *Wings. Lesser coverts* at edge of wing, brownish grey, finely marked with buffy, remaining lesser coverts and *middle coverts*, chestnut, few black; *greater coverts*, black, outer ones, greyed and margined with chestnut; *primaries*, brownish; *secondaries*, inner ones white, central ones, black, outer ones, greyish with white tips; *tertials*, pale greyish buff; *lining* and *axillars*, white.

ECLIPSE PLUMAGE: The moult into the eclipse begins in early summer and is at its height, probably, in August. The full-plumaged wing is renewed. The eclipse plumage is a reproduction of that of the female except that the feathers of the chest are more finely marked with transverse bars; the bill becomes like that of the female, except that it is not spotted.

AUTUMN PLUMAGE: In early autumn the male commences a continuous moult out of the female-like plumage of the eclipse, into the full winter dress. The wing is as in full plumage. In early stages the male may be identified by a scattering of the vermiculated, grey feathers of winter plumage on the *back* and *scapulars*; also by the appearance of new crescent-marked feathers on the *chest*, and black ones on the *tail-coverts*; the bill still resembles that of the female, except that it is not spotted. During October, gradually increasing numbers of grey back-feathers, and of crescent-marked ones on the *chest*, become apparent. By November most of the birds are in full winter plumage.

ADULT FEMALE. *Head*, with slight crest, and *neck*, pale buffy, streaked with dusky, darker on *crown*; *chin* and *throat*, whitish, faintly spotted with greyish; *bill*, dull orange, spotted with dusky, and dusky along ridge, shorter than head; *nail*, black; *eye*, dark brown to brown. *Body. Back*, *scapulars*, *chest* and *sides*, brown, feathers broadly margined, and with transverse bars of buff; *breast*, white; *belly*, pale, often whitish, more or less faintly streaked with dusky; *feet*, dull yellow, *webs*, dusky. *Tail*, dusky, marked with buffy or whitish at tips; *upper coverts*, brown, margined with buffy; *under coverts*, similar, with paler, even whitish, margins. *Wings. Lesser and middle coverts*, brownish grey, a few middle coverts faintly tinged with chestnut and black; inner *greater coverts*, black, outer ones, greyish white; *primaries*, greyish brown; *secondaries*, inner ones forming white *speculum*, central ones black or grey, outer ones grey; *tertials*, pale greyish buff; *lining* and *axillars*, white.

JUVENILE. By September plumage of both sexes resembles that of adult female but is darker and much more heavily streaked on underparts. Young male can be told from young female by light bars on feathers of *foreback*, lacking in young female, and by presence of vermiculated feathers on *flanks*. During late fall and winter, sexes differentiate rapidly and by March plumage is practically adult except *breast* somewhat spotted. Plumage is fully adult by second autumn. *Wing of Male.* As an adult male but *tertials*, shorter and duller; *coverts*, with less chestnut. *Wing of Female.* As in adult but *tertials*, shorter and browner; black in *greater coverts* and *speculum*, sometimes replaced by dusky, and mottled with grey.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A medium-sized, dark-grey duck, with white breast and black hindquarters. Chief distinguishing features (a) hind toe without lobe, (b) white in speculum, (c) chestnut wing-patch, (d) yellow feet.

The Gadwall is the only River and Pond Duck with white in the speculum. The only other ducks of this subfamily with yellow feet are the Wood Duck and the tiny Blue-Winged and Cinnamon Teals.

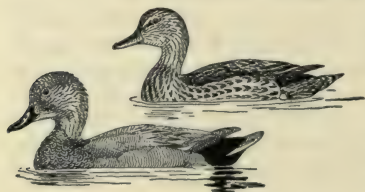
AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A medium-sized, mottled-brown duck, with whitish breast. Chief features (a) hind toe without lobe, (b) white in speculum, (c) dull yellow feet.

The white speculum separates it from all other River and Pond Ducks. Superficially resembles females of Pintail, Baldpate, and European Widgeon, but these species lack the yellow feet of the Gadwall.

FIELD MARKS

ON THE WATER. Gadwalls appear as medium-sized, greyish-brown ducks, with head and neck noticeably paler; in the distance they look like small editions of the Black Duck, but the body colour is lighter. The flashy, white speculum is usually a poor identifying feature, seldom being visible when on the water, as the flight-feathers of the sitting bird are generally covered by the feathers of the sides. Gadwalls frequently associate with Baldpates and Pintails; the former, which they closely resemble, have a white wing patch on the *forepart* of the wing



while that of the Gadwall is on the *hindpart*, and not always visible. The Gadwall sits low and flat on the water, while the Baldpate rests buoyantly, seemingly more alert, with tail held high; the Baldpate shows a conspicuous white patch on flanks, lacking in the Gadwall. The slender appearance of the female Gadwall may cause confusion with the female Pintail.

IN FLIGHT. Gadwalls fly in small, compact flocks, swiftly and in a direct course; the body seems slender, the wing-beats quick and the wings appear long and pointed. As the Gadwall is the only River and Pond Duck with a white speculum, this is the outstanding distinguishing mark for both sexes, and is very evident when flying. (White wing-patch of Baldpate is on *forepart* of wing.) The black rump of the male Gadwall is conspicuous in flight, and the red wing-patch and yellow feet are visible with glasses, and are good identifying features.



VOICE. The male has a loud call, *kack-kack*, a deep reed-like note, *whack*, and a shrill whistled call; the female has a loud *quack*, pitched higher and not so raucous or loud as that of the female Mallard.

LIFE STORY

The Gadwall probably has a wider world-distribution than any other duck; South America and Australia are the only two places where it is not to be found. On this continent it is primarily a bird of the western and central regions, but nowhere in its range can it be called abundant. It is peculiar in that its distribution is very irregular; it is reasonably plentiful in certain localities and entirely absent in others. In spite of the fact that it is the easiest of all ducks to identify, in either sex (it is the only Surface-feeding Duck with a white speculum), it is very often confused with the female and young male of the Pintail, with which species it frequently associates; they are both indiscriminately called "grey ducks." Perhaps this unfortunate confusion of the species accounts to some extent for the reported scarcity of the Gadwall.

"As the Gadwall is one of the later migrants northward in the spring, not appearing usually until the ice is all out of the ponds, so it is also one of the earlier ducks to leave in the fall and start on its short flight to its winter home in the Southern States, principally in the lower Mississippi Valley and in Mexico. The Gadwall is primarily a fresh-water duck, breeding far in the interior and wintering principally in the inland ponds, marshy lakes, sloughs, and swamps, where it can find mild weather and plenty of food; but it frequents to some extent the brackish pools and estuaries along the coasts of Louisiana and Texas, where it is very common" (Bent, 1923).

"The mating flight of the Gadwall is always interesting and is seen constantly when the birds are on their breeding grounds. . . . The

flight is usually performed by two males and one female. In the beginning two males approached a female in the water, calling and bowing. She usually rose at once and flew with a slow flapping flight, mounting in the air with the males in pursuit, calling and whistling constantly. First one and then the other of the males swung in front of her, set his wings, inclined his body upward to show his handsome markings, and, after a few seconds, dropped back again to his former position. Late in the season there was always one of the males who was favored and who displayed more often than the other, flying close to the female, so that in passing his wings often struck hers, making a rattling noise. . . . When the flight was over the birds descended swiftly to the water again. . . . When the birds were in the shelter of the rushes they went through other mating actions of interest. The male swam toward the female bowing by extending his neck until the head was erect and then retracting it, bringing his bill down onto his breast. He then approached, pressing his breast against the sides of the female and shoving her easily, first on one side and then on the other, biting her back and rump gently as he did so. After a few seconds she lowered her body in the water and copulation took place with the female entirely submerged save for the crown of her head while half of the male was under water. As the female emerged the male turned immediately to face her and bowed deeply, giving a deep reedy call as he did so" (Wetmore, 1920).

Whenever possible the Gadwall will choose an island as the site for its nest and, failing this, will build in meadows or on the prairies, always on dry ground and never near to water. The nest is a scooped-out hollow lined with the material of the immediate vicinity with which is mixed down and feathers from the duck's breast; it is usually well concealed under bushes or in thick grass, which is often arched over it. The Gadwall lays from 7 to 13 dull creamy-white eggs but the usual set is 10 or 11. The average size of the eggs is 2.18 by 1.56 inches.

The actions of this duck when incubating are described by Dawson (1909) as follows: "The bird's behavior when surprised depends altogether upon the stage of incubation reached. In general, the bird sits close until discovered; after that, if the eggs are fresh, the duck may flee upon sighting her enemy a hundred yards away; but if the eggs are near hatching, she will endeavour to lead the investigator astray by painfully dragging herself through the grass. If too much harassed, however, she will desert her eggs outright rather than wait for what she regards as inevitable doom, and the same remark will apply to almost any of the nesting ducks."

The Gadwall is one of the few Surface-feeding Ducks that can and does dive for its food, though this habit is only indulged in when absolutely necessary; it usually feeds by dabbling in the marshes and sloughs. Throughout most of the year its food is almost entirely vegetable, though during the summer it consumes an appreciably higher percentage of animal matter. It walks well on land and often wanders far from water, visiting fields of wheat, barley, buckwheat and corn and nearby woods

in search of nuts and acorns. An examination of the stomach contents of 362 of these ducks collected from September to March, from 19 States and Canada, gave the following approximate percentages: pondweeds, 42; sedges, 20; algae, 10; coontail, 8; grasses, 8; arrowheads, 3; cultivated grains and miscellaneous plant food, 7; total vegetable food, 98 per cent. Water bugs, water beetles, flies, and various insects and larvae, 2 per cent, constitute the animal food consumed. This percentage is increased during the summer to about 11 per cent, judging from an analysis of 13 stomachs collected during summer months.

It would be thought that with a diet so largely vegetable this duck would be especially desirable as a table bird and there would be no difference of opinion on the matter. In the judgment of some, it is considered the

equal of the Mallard, others, however, state that it is hardly fit for food. It is probable, therefore, that the quality of the flesh is greatly influenced by the type of food being indulged in at the particular time.



European Widgeon

Mareca penelope
(ma-ré-ka, pe-nél-o-pe)

Colour Plate No. 9.

SCIENTIFIC NAME

Mareca, the Brazilian name of a kind of Teal; *penelope*, Greek or Latin, penelope or penelopa, a mythological character celebrated for her virtue, but as the use of this name has no meaning in the context, it is probably a mistake for *penelops*, Latin, a kind of duck, so called by Pliny.

COLLOQUIAL NAMES

IN GENERAL USE: Widgeon. IN LOCAL USE: Ice duck; Norwegian duck; Norwegian widgeon; redhead; red-headed widgeon; swamp widgeon.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and neck*, bright cinnamon red with buffy-cream *forehead* and *crown*; sides and back of head, minutely flecked with black spots with greenish gloss, a dark ring of spots around eye; *throat*, dusky; *bill*, much shorter than head, bright greyish blue, with black tip, lower mandible black; *eye*, dark brown; lower *eyelid*, buffy, upper, black. *Body. Back, scapulars and sides*, white, finely vermiculated with dusky, producing grey effect, longer scapulars slightly washed with cinnamon; *rump*, lighter grey with white edgings; *chest*, purplish pink, with sometimes a few darker spots; *breast and belly*, pure white; white patch on *flanks* at each side of base of tail; *feet*, light bluish grey to dull yellowish brown, with slightly darker *webs*. Tail, middle feathers, dark grey to dusky brown, pointed, others silvery grey, edged with white; *upper coverts*, glossy black, middle ones with inner web whitish or buffy; *under coverts*, black. *Wings. All coverts*, white, except *lesser coverts* along edge of wing, brownish, *greater coverts* tipped with black; *primaries*, ashy brown; *secondaries*, with metallic-green *speculum*, shading to black behind, and bordered in front with black and inwardly with white; *tertials*, black, edged with white, dusky on inner web; *lining*, silvery grey, speckled with brownish grey; *axillars*, flecked and mottled with greyish.

ECLIPSE PLUMAGE: The moult into eclipse begins in June or July and is at its height in August. The full-plumaged wing is renewed. In eclipse plumage male closely resembles female except for wings.

AUTUMN PLUMAGE: From the eclipse plumage, in which it closely resembles the female, except for the wing, the adult male in early autumn starts to moult into the winter plumage. In early stages the male can be recognized by the presence of some cinnamon-red feathers of the winter plumage on the *head*, and by the new vermiculated feathers which are appearing on the *back, scapulars and sides*. Later in the autumn the buffy-cream *forehead* and *crown* become evident, while the cinnamon red of the *head* and *chest* resembles more and more that of the full plumage; a few brownish eclipse feathers still linger on the *back* and *sides*.

ADULT FEMALE. *Head and neck*, cinnamon buff, flecked with dusky or greenish, darker around eye and on *back of head*; *bill* and *eye*, same as in male. *Body. Back, scapulars and rump*, dusky brown, feathers edged with brownish buff or grey, longer scapulars edged with brownish buff, and white on longest;

chest and sides, buffy brown, with faint reddish tinge, faintly marked with dusky; *breast and belly*, white; *feet*, same as those of male. *Tail*, brownish grey, feathers edged with whitish or buffy; *upper coverts*, like tail; *under coverts*, white barred with dusky brown. *Wings*. All *coverts*, dusky grey or brown, with whitish tips, the greater, margined with white and tipped with black and then white; *primaries*, dusky brown; *secondaries*, with dull, dark *speculum*, usually with small green patch; bordered inwardly with whitish and behind narrowly with white; *tertials*, brown, margined with whitish; *lining* and *axillars*, pale greyish, mottled with dusky.

JUVENILE. Some as that of Baldpate, but general tone of *head* and *neck* pinkish buff or cinnamon instead of creamy white. *Wing of Male*. As in adult male but *lesser* and *middle coverts*, ash brown, clouded with grey (white in adult) and with dark shafts (very distinct from white-edged coverts of adult female which young male otherwise closely resembles in autumn); *tertials*, duller and shorter. *Wing of Female*. As in adult female but *speculum* usually duller, often being dusky, clouded and mottled with grey; inner *secondary*, bordering on *speculum*, darker grey; *lesser* and *middle coverts*, less broadly edged with white; *greater coverts*, greyer. *Wing of Both Sexes*. *Lining* and *axillars*, speckled as in adults (a good feature to distinguish from adult female and juvenile of Baldpate).



SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A medium-sized, white-breasted grey duck, with red head and neck, and creamy crown. Chief distinguishing features (a) hind toe without lobe, (b) creamy crown, on red head, (c) underwing surface, ashy, mottled with grey.

The Baldpate is somewhat similar but its underwing lining is not mottled (fig. 41), and it has a white crown and green face-patch. The Gadwall has a white *speculum*, yellow feet and chestnut wing-patch.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

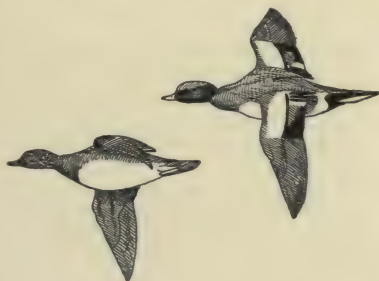
FEMALE. General effect: A medium-sized, brownish duck, with a white breast. Chief features (a) hind toe without lobe, (b) dull, dark *speculum*, usually with green gloss, bordered inwardly with whitish, (c) blue-grey feet, (d) underwing surface, mottled with grey, and *axillars* speckled.

The other white-breasted, brown ducks of this subfamily are the female Baldpate, in which the underwing surface is not mottled (fig. 41), and the female Gadwall, which has a white *speculum* and yellow feet. The resemblance to the female Pintail is superficial; the specula of the two species are quite distinct.

FIELD MARKS

ON THE WATER OR IN FLIGHT.

The field marks of this species are similar to those of the Baldpate. The male can be separated in the field from the male Baldpate, by its much darker head and creamy instead of shiny, white crown; the body colour is decidedly paler throughout. Females of the two species are difficult to separate, but in flight the female Baldpate shows more white below, due to whiter wing-linings. See Baldpate.



VOICE. The call note of the male is a shrill whistling, *wh'e-e-you*; that of the female, a low purr or a croak; a note like *kir-r-r*.

LIFE STORY

The European Widgeon, a popular game bird of Europe and a close relative of our Baldpate or American Widgeon, frequently visits our Atlantic seaboard from New England to the Carolinas and occasionally the Pacific coast as well as the interior of the continent. Its occurrence on the Atlantic coast has generally been during the autumn and winter, on the Pacific coast, in winter, and in the interior mostly in the spring. It is not known to have bred in North America. Its eggs are indistinguishable from those of the Baldpate; the usual clutch consists of 7 or 8 eggs and, according to Witherby's Handbook, the average size is 2.15 by 1.52 inches.

A fact about a feeding habit of these birds is related, in an amusing manner, by Millais (1902), who says: "One day in Iceland I observed with a telescope a small party of male Widgeon whose wives were engaged in domestic affairs, paddling along the edge of a small lake near Myvatn, and picking the flies off the stones in hundreds. This particular insect, a sort of stinging house fly, is very nutritive and tastes like a piece of sugar. As you are obliged to eat plenty of them yourself, for they are always getting into your mouth, you soon get used to them and swallow them with great equanimity, and it is common sight to see the Icelandic children of the Myvatn district picking these natural lollipops off their faces and eating them by dozens."

In appearance and habits the European Widgeon is very similar to the Baldpate; the underwing surface will tell the tale. If it is whitish, mottled with dusky or ashy (in either sex) it is an European Widgeon and any specimen taken should be reported to the Fish and Wildlife Service, Washington, D. C., or to the National Museum of Canada, Ottawa, Canada. It is probably far more common on this continent than is generally imagined. As both sexes closely resemble Baldpates, especially the females, it is altogether likely that these visitors are frequently mistaken for native species, and together with our Gadwalls, Baldpates, and female Pintails, are probably grouped by ignorant gunners under the name "grey duck."

Baldpate

Mareca americana
(ma-ré-ka, a-mer-i-kán-a)

Colour Plates Nos. 9 and 11. Downy Young No. 33.

SCIENTIFIC NAME

Mareca, the Brazilian name of a kind of Teal; *americana*, Latinized form, meaning of America.

COLLOQUIAL NAMES

IN GENERAL USE: Baldpate (sometimes shortened to baldy or bally); widgeon. IN LOCAL USE: Baldcrown; baldface; bald-faced widgeon; baldhead; bald widgeon; baldpate widgeon; bluebill; bluebill widgeon; California widgeon; canvasback; diamond duck; French teal; grey duck (female); L-wing; Norwegian poacher; southern widgeon; specklehead; wheatduck; whistler; whistlingdick; whistling duck; whitebelly; whiteface; zin-zin.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head*, with slight *crest*; *forehead* and *crown*, pure white, sometimes faintly tinged with buffy; patch of glossy green from eye extending around hind head; rest of *head* and *neck*, creamy to buffy, speckled with black; *chin*, dusky; *throat*, dusky, or sometimes creamy, with very few markings; *bill*, narrow and much shorter than head, greyish blue, tip, extreme base and lower mandible, black; *eye*, yellowish brown to dark brown. *Body. Upper back* and *scapulars*, pinkish brown finely vermiculated with dusky; *hind back*, dusky grey, *rump*, white, finely vermiculated with grey; *chest* and *sides*, purplish-pink, sides finely vermiculated with dusky; *breast* and *belly*, white, sometimes suffused with rusty; white patch on *flanks* at each side of tail; *feet*, greyish blue, with dusky *webs. Tail*, middle feathers, pointed, dark grey to dusky brown, others, silvery grey, edged with white; *upper coverts*, glossy black, bordered with white on inner webs, inner ones greyish, bordered with white; *under coverts*, black. *Wings. Lesser coverts*, brownish grey along forward edge of wing; *middle* and *greater coverts*, white, greyish brown inwardly, the latter tipped with black; *primaries*, pale brownish grey; *secondaries*, with *speculum* of glossy green shading into black behind, and bordered with black in front and with white inwardly; *tertials*, lengthened, black, with white edges, grey brown on inner webs; *lining*, pale ashy grey, without mottling; *axillars*, white, sometimes faintly flecked with grey.

ECLIPSE PLUMAGE: The moult into the eclipse plumage begins in June and lasts through July, being complete in August. The full-plumaged wing is renewed. In this plumage the male closely resembles the female except for the wings.

AUTUMN PLUMAGE: In early autumn the male commences a continuous moult out of the female-like plumage of the eclipse into the full winter plumage. The wing is as in winter plumage. In the early stages of the moult the adult male can be recognized by the appearance of some of the new, green feathers of winter plumage on the *head*, and a sprinkling of purplish-pink ones on the *chest*, and by the first new, vermiculated, pinkish-brown feathers on *back* and *scapulars*. During October, the pinkish-brown, vermiculated plumage of the *upper body* is gradually

completed, and the dark *chest-feathers* of the eclipse plumage give place to the plain purplish-pink of the full winter dress; the vermiculated feathers appear on the *sides*, and by early December most birds have completed the moult. Considerable variation may be expected in the sequence of the plumage changes.

ADULT FEMALE. *Head*, whitish to creamy, streaked with dusky, darker behind eye and on back of head; *neck*, spotted or barred with dusky; *bill* and *eye*, same as in male. *Body. Back, rump* and *scapulars*, greyish brown, feathers edged with yellowish brown and greyish, *scapulars*, edged and barred with yellowish brown, longest one tipped with white; *chest*, yellowish to reddish brown, suffused with greyish brown; *sides*, yellowish to reddish brown, tipped with paler; *breast* and *belly*, white; *feet*, same as those of male. *Tail*, pointed, greyish brown, edged narrowly with whitish; *upper coverts*, brown, tipped with whitish, outer ones barred with whitish; *under coverts*, white, barred with brownish. *Wings. Lesser* and *middle coverts*, brownish grey, tipped with whitish; *greater coverts*, tipped with blackish then sometimes narrowly with white; *primaries*, dusky brown, lighter on inner webs; *secondaries*, with black *speculum*, sometimes with glossy green spot on upper and inner corner, occasionally extending half-way across *speculum*, outer feathers greyish, all slightly tipped with white, sometimes margined and slightly speckled with whitish, *speculum* bordered inwardly with greyish white; *tertials*, dusky brown, slightly glossed with bronzy, outer webs, dusky brown to blackish, and margined with white; *lining*, pale ashy grey; *axillars*, white.

JUVENILE. By August both sexes are similar to adult female except feathers of *scapulars* are less margined with yellowish brown; in young males the vermiculated *side-feathers* appear in September and at once distinguish the sex. From September the feathers of *back* of young male begin to be replaced by the vermiculated pinkish-brown feathers, and the brownish colour of *chest* gives place to the purplish-pink colour of that of the adult. By December or January the plumage of young male closely resembles that of adult. Full adult plumage by second autumn. *Wing of Male.* As in adult male but *lesser* and *middle coverts*, buffy, clouded with dusky and with dark shafts; *tertials* are browner, and have very narrow whitish edgings, and lack gloss of those of the adult female (In most cases, but not all, the immature wing-coverts are retained until after the first post-nuptial moult.) *Wing of Female.* As in adult female but *greater coverts* are dusky, with only a thin bar of whitish near tips; *lesser* and *middle coverts*, darker, browner, with narrow edgings; *secondaries*, on inner border of *speculum*, darker grey than in adult female.

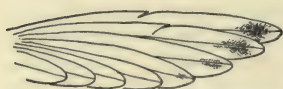


FIG. 41.—Above, mottled axillars of the European Widgeon. Below, axillars of the Baldpate, without mottling.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A medium-sized duck, with purplish-pink body, white breast and black hindquarters. Chief distinguishing features (a) hind toe without lobe, (b) head, with white crown and green patch on face and hind-head, (c) underwing-lining, pale grey, not mottled, and axillars white or only sparsely flecked with grey (fig. 41), (d) bill, much shorter than head, greyish blue, with tip, extreme base and lower mandible, black.

The male European Widgeon and Gadwall are more like this duck than are any of the others. The European Widgeon has a bright, cinnamon-red head, a creamy crown and mottled underwing-surface, with axillars almost completely flecked with grey; the Gadwall has a white speculum and chestnut wing-patch.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A medium-sized, yellowish-brown duck, with a white breast. Chief features (a) hind toe without lobe, (b) dull black speculum, with or without green, bordered inwardly with white, (c) blue-grey feet, (d) underwing surface, pale ashy, not mottled, and axillars white.

In this subfamily the other white-breasted, brown ducks of medium size are the female European Widgeon, which has a mottled underwing-surface and a more reddish coloration, and the female Gadwall, which has more white in the speculum and has yellow feet. The resemblance to the female Pintail is superficial; the specula of the two species are quite distinct.

FIELD MARKS

ON THE WATER. Baldpates appear as small, brownish ducks. They sit buoyantly on the water, chest low and tail well elevated; bend of wing is carried low, and tip of wing is pointed upwards; they pivot frequently as they feed and appear ever on the alert. The shiny white crown of the male, dark headpatch and pale grey neck give these parts a somewhat pie-bald appearance; the large white patch on each flank near base of tail is noticeable on the males at considerable distance. The closest resemblance is to



the rarely-encountered European Widgeon, whose red head and light grey back will identify; when these species are seen together the male Baldpate looks like a dark-bodied bird with light head, while the male European Widgeon looks like a light-bodied bird with dark head. Gadwalls are similar but lack the white crown; their white speculum, if visible, appears near the rear of their body as they sit; they lack the white flank-patch; they are longer of body than Baldpates and rest less buoyantly on the water. The female Baldpate is very similar to female Gadwall.



IN FLIGHT. These ducks fly swiftly in small compact flocks in irregular formation, with many twistings and turnings. They are prompt to take alarm and rise quickly and vertically from the water, making a rattling sound with the wings. Flocks are readily recognized by the conspicuous markings of the drake: the white crown and breast, large white patch on forewing and black under tail-

coverts being very noticeable. The females show the white breast, whitish wing-patch, and grey underwing surface, and are similar to the female Gadwall but show no white in the speculum.

VOICE. The males have a wild and musical note, *whew, whew, whew*, repeated constantly in three's, both when flying and on the water; the female utters a *qua-awk, qua-awk* and a louder cry, *kaow, kaow*. Their quacks of alarm seem to express great terror.

LIFE STORY

The Baldpate is a New World species and breeds exclusively in North America. Most members of this species spend their winters on this continent, though some prefer the West Indies and parts of South America as winter resorts. The Baldpate closely resembles its near relative the European Widgeon, both being of the genus *Mareca*, and is probably more commonly known by its alternative and quite proper name, American Widgeon. The name "Baldpate," however, should be strictly adhered to on account of the unfortunate habit among gunners of calling all ducks which they are unable to identify either "widgeon" or "grey duck," especially the females and juveniles of Pintail, Gadwall, and the present species.

Baldpates are distinctive, interesting, and graceful birds; on the water they sit lightly and pivot frequently as they peck for their food. They are active on land, where they trot about and graze like little geese. Their flight, with its rapid evolutions in dense flocks, is like that of pigeons around a barn. In his full winter plumage with his shining white crown, the drake is a handsome, showy bird.

The Baldpate is commonly referred to as "thieving," and prominent among its local names is "poacher." Honestly earned are these appellations, or perhaps, dishonestly earned, would be nearer the mark! Baldpates are inordinately fond of wild celery and, as their diving ability is not great, they pursue flocks of Canvas-backs, Redheads, and other Diving Ducks to rob them of the fruit of their honest labours. They seem

to see their victims coming up through the water, for they often swim to the spot where they will emerge and are ready to snatch the desired morsel as soon as a bill appears above the surface. There is nothing surreptitious in the act as is implied by the words thieving or poaching, it is robbery on the high seas, piracy, no less!

They are nervous, restless birds, quick to take fright, at which time they rise perpendicularly from the water with loud rattling of wings and fly excitedly away, twisting and circling in closely bunched bands. Their quacks of alarm express the limit of terror and they impart their nervousness to the flocks of



Nervous Baldpates giving alarm to Canvas-backs by their sudden flight.

Diving Ducks with which they are in frequent association. As a result of their alertness and quickness to perceive the approach of danger they give alarm, by their quick flight, to the other ducks with which they are flocking; this, to the annoyance of the gunner in the blind.

The Baldpate decoys readily and, being a swift and erratic flyer, is a favourite with gunners, but in spite of its vegetarian diet it does not

rank particularly high as a table bird. Its curiosity causes it to return again and again to the decoys, a trait which seems at variance with its shy, wild disposition. Market hunters at one time reduced the numbers of this bird to a point where extinction seemed inevitable, but since market hunting and spring shooting have been abolished its increase has been most marked. Like the Black Duck it has become, to a large extent, a night feeder and spends the hours of daylight in the safety that is lent by distance from shore.

Mating probably does not occur until after arrival on the breeding grounds. The mating flight of the Baldpate resembles that of the Gadwall but is performed with more dash and speed. The following account of the courtship is from a description by Wetmore (1920): "The birds fly swiftly and erratically. The males dart ahead of the female, setting and decurving their wings and throwing their heads up, exhibiting their striking markings to the best advantage. The female calls *qua-awk, qua-awk*, and the males whistle *whew whew* constantly during this performance. Occasionally, as a pair swung in low over the water, the male darted ahead and, with decurved wings and head thrown up, scaled down to the surface. Two males and a single female invariably took part in the display flight which began, as in the Gadwall, by the males approaching the female, bowing and whistling, and then following her as she rose in the air."

The Baldpate always builds its nest on dry ground and often at a considerable distance from any water; there is little attempt at concealment, and the nest itself is merely a slight hollow, well lined with grass, weed stems, and down from the breast. Both the nest and the eggs are indistinguishable from those of the European Widgeon. The Baldpate is a late breeder and laying is seldom completed until after the middle of June. The number of eggs varies from 6 to 12, but 9 to 11 is the usual set. They are creamy white in colour and the shell is clear, smooth and somewhat glossy. The average size of the egg is 2.12 by 1.51 inches. The period of incubation is probably the same as that of the



European Widgeon, which is 24 or 25 days; the male does not assist in the process but remains at hand until the moulting season commences.

The female guards her young with jealous care, as the following account by Nelson (1887) illustrates: "I once came suddenly upon a female widgeon, with her brood of ten or a dozen little ducklings, in a small pond. As I approached the parent uttered several low, guttural notes and suddenly fluttered across the water and fell heavily at my feet, so close that I could almost touch her with my gun. Meanwhile, the young swam to the opposite side of the pond and began to scramble out into the grass. Willing to observe the old bird's manoeuvres, I continued to poke at her with the gun as she fluttered about my feet, but she always managed to elude my strokes until, just as the last of her brood climbed out of the water, she slyly edged away, and suddenly flew off to another pond some distance away. I then ran as quickly as possible to the point where the ducks left the water, yet, though but few moments had elapsed, the young had concealed themselves so thoroughly that, in spite of the fact that the grass was only 3 or 4 inches high and rather sparse, I spent half an hour in fruitless search."

"The Baldpate feeds on or near the surface by dabbling in the mud or tipping up in shallow water. Where not disturbed it is liable to feed at any time during the day, though it is always more active in the early morning or toward night. But, as it seldom enjoys much security, it more often spends the day skulking in the reeds, dozing on some sunny bank, or playing about on open water at a safe distance from land: then as dusk comes on it repairs in small flocks to its feeding grounds, where it can feed in safety during the greater part of the night" (Bent, 1923).

An examination of the stomach contents of 229 Baldpates, taken during the eight months from September to April and from 25 States, 4 Canadian Provinces, Alaska and Mexico, showed the average diet to be over nine-tenths vegetable, and gave the following approximate percentages: pondweeds, 43; grasses, 14; algae, 8; sedges, 7; wild celery and waterweed, 6; water milfoils, 3; duckweeds, 2; miscellaneous plant food, 10; total vegetable food, 93 per cent. Molluscs, 6; insects and miscellaneous, 1; total animal food, 7 per cent. The feeding habits of this bird are very similar to those of the Gadwall.

In the autumn the Baldpate starts south early in September and loiters considerably on the way, leisurely spreading out from its inland breeding range to its winter quarters on the coasts. In the spring it is not one of the earliest migrants and does not usually arrive at the Canadian border until late in May. It winters on both the south Atlantic and Pacific coasts and on the coasts of the Gulf States in association with Mallards, Pintails, Gadwalls, and Lesser Scaup Ducks.

American Pintail*Dafila acuta tzitzihoa*(*Anas acuta tzitzihoa*, of Peters)

(dáf-fi-la, a-kú-ta, tzits-ze-hó-a; á-nas)

Colour Plates Nos. 10 and 11. Downy Young No. 33. Hybrids No. 36.

SCIENTIFIC NAME

Dafila, Coues says "a non sense word"; *acuta*, Latin, meaning acute, pointed, as the tail is; *tzitzihoa*, the name of a species of duck in the Nahuatl language of Mexico. Originally called "*De Tzitzihoa Mare*."

COLLOQUIAL NAMES

IN GENERAL USE: Grey duck (sometimes meaning only the female and immature); pintail; pintail duck; pinnie; sprig; sprigtail. IN LOCAL USE: Canard gris (grey duck); fall duck; grey widgeon; kitetailed widgeons; longneck; necktwister; paille-en-queue (straw-tail); pent-tail; pheasant; pheasant-duck; picket-tail; pied gray duck; pike-tail; pile-start; pintail widgeon; sea widgeon; smee; smeets; smethe; smoker; spike; spike-tail; spindletail; split-tail; spring-tailed widgeon; springtail; sprit-tail trilby duck.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, dark brown, glossed with purplish, pink, and green; *crown*, dusky; *hindneck*, black or dark brown, shading gradually into grey of foreback; *foreneck*, white, extending by white stripes on sides of neck into dark brown of head; *bill*, shorter than head, grey blue, black along ridge, with elongated black spot at base; *nail*, black; *eye*, dark brown. *Body.* *Back*, *inner scapulars* and *sides*, white, vermiculated with black, producing grey effect; *outer scapulars*, longer, with outer web glossy black edged with white to grey, producing large patch over the folded wing; *chest* and *breast*, white hind-breast and *belly*, white, finely vermiculated with grey; *rump*, ashy brown; large white or sometimes yellowish patch on either *flank*, bordered behind with black; *feet*, greyish blue to olive grey, with dusky *webs*. *Tail*, two middle feathers, black greatly elongated and pointed, remaining feathers of tail, brownish grey with light edgings; *upper coverts*, black with greyish-white inner webs; *under coverts*, black, margined with white on outer webs. *Wings.* All *coverts*, brownish grey, the greater tipped with cinnamon to cinnamon buff; *primaries*, darker brownish grey, with lighter inner webs; *secondaries*, with *speculum* of violet, bronze and green, bordered behind with black then white bars, and in front by cinnamon-buff bar, and inwardly with black; *tertials*, long, grey, with glossy black stripes; *lining*, dusky, with white edgings; *axillars*, white, mottled with dusky.

ECLIPSE PLUMAGE: The moult into eclipse commences in June and is complete in August. The full-plumaged wing is renewed. In this plumage males are similar to females except for wings and greater size; even more do they resemble the juvenile male, especially in markings of feathers of back.

AUTUMN PLUMAGE: From the female-like plumage of the eclipse, the adult male commences, in early autumn, a moult towards full winter dress. The wing is as in winter plumage. In early stages a sprinkling of new vermiculated feathers can be noticed on *upper back* and *sides*; with the early appearance of some brown *head-feathers*, and indications of the white *neck-stripe*, the bird is soon recognizable

as a male. In later autumn the vermiculated grey feathers of winter plumage are found on *lower back* and *sides*, and the *long central tail-feathers* begin to be noticeable. With completion of black *scapulars* in late November or early December, the male Pintail has attained his full winter plumage. Considerable variation may be expected in the progress and sequence of the moult.

ADULT FEMALE. *Head and neck*, buffy, spotted and streaked with dusky, darker on *crown*; *chin and throat*, pale, only faintly marked with dusky; *hind-neck*, like crown; *foreneck*, buffy with brown markings; *neck*, long and thin; *bill*, shorter than head, dark grey blue, sometimes with faint markings as in male; *eye*, dark brown. *Body.* *Back, scapulars and rump*, brownish black, each feather marked with V-shaped buffy bars and edged with whitish to cinnamon buff; *chest and sides*, with about equal amounts of whitish or buffy white, and dusky brown; *breast*, whitish to pale buffy brown, spotted with dusky brown; and sometimes stained with rusty; *feet*, dark greyish blue to greenish grey, *webs*, dusky. *Tail*, pointed, central feathers slightly elongated, dusky brown, edged and barred with buffy whitish; *upper coverts*, like back but with broader white edges; *under coverts*, whitish, streaked with brown. *Wings.* *Coverts*, browner than those of male, edged with whitish, the greater, edged with cinnamon buff to white; *primaries*, same as those of male; *secondaries*, with *speculum* similar to that of male but very much duller and usually speckled with blackish, the iridescence sometimes entirely replaced by dull brown; *tertials*, dull brown, edged with buffy or whitish and sometimes streaked with buffy; *lining*, dusky, with white edgings; *axillars*, white, mottled with dusky.

JUVENILE. By the middle of September sexes are similar, and superficially resemble adult female except *underparts* are more noticeably and regularly streaked. In young males edgings to *back-feathers* are less buffy than in adult female, and the markings are in form of wavy transverse bars and vermiculations. *Back-feathers* of young female are edged with whitish, not buffy, as they often are in adult female. By the beginning of December many young males achieve fully adult plumage, except for wings; the majority, however, do not arrive at this stage, with lengthened *tail*, until February and even then are somewhat duller than mature males. Fully adult plumage in second autumn. *Wing of Male.* As in adult but white tips to *speculum*, and cinnamon tips to *greater coverts*, usually narrower; *lesser and middle coverts*, sometimes browner, less grey, and edged with buff; *tertials*, rounded, shorter, and olive brown. *Wing of Female.* As in adult female but *tertials*, plainer, and without buff markings; *speculum*, usually more mottled, and white tips to *greater coverts* and *speculum*, narrower.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A large, grey-backed, whitebreasted duck, with brown head and long tail. Chief distinguishing features (a) hind toe without lobe, (b) middle pair of tail-feathers greatly elongated, (c) dark brown head, with white stripes, and very long neck.

The only other duck that has an elongated tail is the Old-squaw which, however, possesses the lobed hind-toe of the Diving Ducks.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

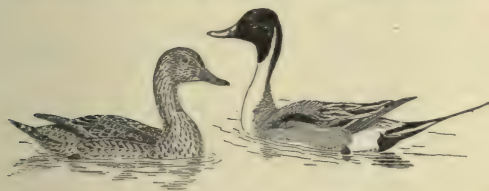
FEMALE. General effect: Entire plumage, mottled brown. Chief features (a) hind toe without lobe, (b) long thin neck, (c) tail, pointed but not elongated, (d) bluish-grey feet.

None of these features, except (a), is possessed by the Black Duck, female

Gadwall, female Mallard, New Mexican, Florida or Mottled Ducks, all of which are also ducks with mottled-brown plumages and a superficial resemblance to the female Pintail. Somewhat resembles females of Baldpate and European Widgeon but the speculum is distinctive.

FIELD MARKS

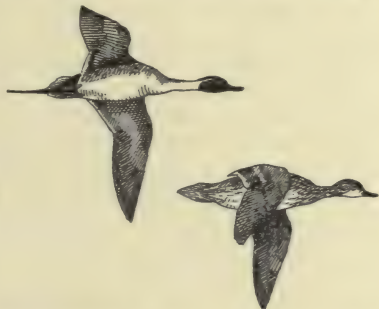
ON THE WATER. Pintails are medium-sized, alert-looking ducks, and flocks are readily recognized by the trim, handsome males. They sit elegantly, the slim head and neck raised in a graceful curve and the long tail pointing upward



at a moderate angle; the grey body, with dark brown head and long white neck is distinctive. The female is like the female Mallard but more slender, has a longer neck and more pointed tail; it is similar also to the slender female Gadwall but lacks the white speculum

of that species. When feeding in shallows in mixed flocks, Pintails do less "tipping" than the others, as they can reach down deeper with their long necks. If they are disturbed, the slender necks are suddenly stretched and held straight upwards.

IN FLIGHT. Pintails are fast, graceful fliers, and with their long, slender necks outstretched and long tails, they give the appearance of great size. The pointed wings and white neck and breast of the males are readily noted in flight. The white edging at rear of wing of both sexes is a good field mark. Flocks have the habit of descending from great heights in a zig-zagging rush with a great roar of wings; when near the water they level off and without a stroke of the wings they "slant in" to a landing. They spring cleanly up from the water and when suddenly flushed, they often "bunch" closely as they start their swift flight. Unaccompanied females,



which are similar to female Mallards and female Gadwalls, can be told in flight by their slender build, long, thin neck, pointed tail and sharp, pointed wings.

VOICE. Male, a loud *qua, qua*, uttered in flight, and a low, mellow whistle like that of the Teals; female, an occasional hoarse, muffled *quack*; the courtship voice of the male consists of soft, mewing notes.

LIFE STORY

On this continent the American Pintail has the widest breeding range of all ducks. As a result of this wide distribution, its abundance throughout its range and the strikingly handsome appearance of the drake, it is probably one of the best known of North American wild fowl. The main breeding grounds of the species to which our Pintail belongs are circumpolar, and closely allied varieties of Pintails are found in northern Europe and Asia.

No duck is more readily recognized in flight than the trim, hand-



some Pintail drake. Its slender form, long, slim neck, pointed wings, and elongated tail, all contribute to make its great speed in the air appear even faster than it really is; its racy lines, as much as the rapidity of its pace, have earned it the name of greyhound among ducks. Flocks have the habit of descending from a great altitude in a zigzagging, volplaning rush. Nelson (1887) says: "They descend with meteor-like swiftness until within a few yards of the ground, when a slight

change in the position of the wings sends the bird gliding away close to the ground from 100 to 300 yards without a single wing stroke. The sound produced by this swift passage through the air can only be compared to the rushing of a gale through tree-tops. At first it is like a murmur, then rising to a hiss, and then almost assuming the proportions of a roar as the bird sweeps by." Not only speed but also endurance is demonstrated by the flight of the Pintail. Numbers of these powerful fliers migrate across the 2,000 mile stretch of ocean between their breeding grounds in Alaska and the sunny shores of the Hawaiian Islands. A flock of Pintails flying parallel to a train travelled at above 52 miles an hour and another flock, when chased by an aeroplane, were timed at about 65 miles an hour. These figures, however, do not disprove the claim of some gunners that these birds travel at a rate upwards of 90 miles an hour, though if such a speed were ever reached it could only be maintained over a short period.

Being one of the earliest of migrants in the spring, the Pintail, as might be expected, is an early breeder and on its western nesting grounds it frequently commences laying in April and broods are hatched by the beginning of June. It often builds its nest farther from water than any other duck but the site chosen is variable; it may be found on the open prairie a mile from the nearest water or again on the very edge of a pond or slough, but always on dry ground. The nest is usually a deep hollow, scooped out of the ground, with a scanty lining of straw and down. The number of eggs varies from 6 to 12 but the usual number is under 10. When first laid, the eggs are pale olive green to very pale olive buff, and resemble those of the Mallard and the Shoveller, averaging in size 2.16 by 1.50 inches. The period of incubation is 22 to 23 days and incubation is performed by the female alone, though the male remains in close attendance until the moulting season commences.

Female Pintails are among the most courageous of all ducks in the defense of their young and their demonstrations of parental solicitude



are truly remarkable. As an example of parental devotion, Bent (1923) relates that once as he waded a marsh in search of nests, a female Pintail flew towards him and dropping into the water near-by began splashing about in a state of great excitement. For an hour or more the bird watched and followed him closely, flying about his head and splashing down into the water near him in a most reckless manner; she swam in small circles, quacking excitedly and acting as if wounded, often close enough for him to have reached her with a stick. The bird was trying to distract his attention from her nest, which was near, and her attempts to do so were with total disregard for her own safety. He states that he has had several similar experiences with this species, and that while most ducks and many kinds of birds adopt these "broken wing" tactics, seemingly the female Pintail persists longer and is more fearless in her stratagems to protect her nest and young ones than most other species.



The same writer says: "The courtship display of the shy Pintail is not often seen, for even on their remote northern breeding grounds the males are even alert and are not easily approached. The performance resembles that of the teals, where several drakes may be seen crowding their attention on a single duck, each standing erect on the water, proudly displaying his snowy breast, with his long neck doubled in graceful curves until his bill rests upon his swelling chest and with his long tail pointed upwards; thus he displays his charms and in soft, mewling notes he woos his apparently indifferent lady love until she expresses her approval with an occasional low quack." Nelson (1887) says: "Once . . . while sitting overlooking a series of small ponds, a pair of Pintails arose and started off, the male in full chase after the female. Back and forth they passed at a marvelously swift rate of speed, with frequent quick turns and evolutions. At one moment they were almost out of view high overhead and the next saw them skimming along the ground in an involved course very difficult to follow with the eye. Ere long a second male joined in the chase, then a third, and so on until six males vied with each other in the pursuit. The original pursuer appeared to be the only one capable of keeping close to the coy female, and owing to her dextrous turns and curves he was able to draw near only at intervals. Whenever he did succeed he always passed under the female, and kept so close to her that their wings clattered together with a noise like a watchman's rattle, and audible a long distance. This chase lasted half an hour, and after five of the pursuers had dropped off one by one the pair remaining (and I think the male was the same that originated the pursuit) settled in one of the ponds." Conover (1926), who observed these birds on their breeding grounds in Alaska, says: "Pintails seemed to do a great deal of their courting on the wing, and it was a common sight to see one or two drakes chasing

a duck about, as she dodged and circled through the air. In one evolution noticed, the female suddenly made an almost perpendicular climb of about fifty feet, accompanying this maneuver by drawing her head back against her shoulders."

Like all members of its subfamily the Pintail is a surface feeder, dabbling and tipping, tail in the air, in the shallow marshes, and having an advantage over its fellows as its longer neck allows it to reach down better into the deeper places. Its diet is nearly nine-tenths vegetable and its feeding habits are similar to those of the Mallard, except that it spends less of its time feeding on dry land remote from water. Of whatever food is most handy or plentiful at the moment, it will make its meal. A good cross section



of its diet is given by the following approximate percentages: pondweeds, 28; sedges, 22; grasses, 10; smartweeds and docks, 5; arrow grass, 4; musk grass and other algae, 3; arrowhead and water plantain, 3; goosefoot, 3; water lilies, 3; miscellaneous plant food, 6; total vegetable food, 87 per cent. Molluscs, 6; crustaceans, 4; insects, 3; total animal food, 13 per cent. These figures were compiled from the examination of the stomach contents of 769 birds taken from September to March inclusive, and from practically all parts of North America.

On the water, Pintails are graceful, agile birds; their slender necks are held in a curving fashion after the manner of the swans and the long tail of the male points upward at an angle that adds to the beauty of his elegant body. They are ever on the alert, quick to take alarm, springing vertically upward from the water like teals; they often bunch closely as they rise, offering a vulnerable target to the gunner in the blind. Pintails are always found in the first bags of the season, together with the Blue-winged Teals and the local Mallards and Blacks. Their speed on the wing and their readiness to come to decoys endear them to sportsmen. They usually approach the decoys from a great height, circling cannily as they watch for the slightest suspicious movement, and not until satisfied that all is well



will they splash in among the wooden blocks. They are welcome additions to any bag and, among the Pond Ducks, rank after only the Mallard and Black as desirable table birds.

In the spring Pintails are among the earliest of migrants and with the first sign of the break-up of the ice they start their northward trek. Late February and early March sees them on their way, and they often reach their breeding grounds in Alaska before the beginning of May. Ready as they are to face the ice and cold of early spring, Pintails, strangely enough, are among the first to flee from the approaching cold of winter, and in the autumn are among the earliest of migrants; the first arrivals come along with the tender little Blue-winged Teals. Their winter, on this continent, is spent on the warm seacoasts of the Southern States and anywhere inland on the marshes and swamps south of the frost line. The summer breeding range of the Pintail is a wide one; the large majority nests in the subarctic regions, and next in preference come the prairie regions of the interior. It may be found, however, breeding here and there across the continent from New Brunswick to central British Columbia and California.

European Teal

Nettion crecca

(*Anas crecca crecca*, of Peters)

(né-t-i-on, krék-ka; á-nas)

Colour Plate No. 12.

SCIENTIFIC NAME

Nettion, Greek, meaning a duckling, a small duck, diminutive of *netta*, a duck; *crecca*, Latin, to express the sound, crex, crake, quack; *anas*, Latin, meaning a duck.

COLLOQUIAL NAMES

None in North America.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, chestnut, dusky on *chin*, *throat* and *forehead*; a glossy green patch including the eye and extending backwards, separated from its fellow by black patch on hind neck and bordered by a narrow, pale line, often clear white, usually extending forward to base of bill; *crest*, chestnut, longer feathers purplish black; *lower neck*, like back; *bill*, black, about as long as head, small and slender; *eye*, dark brown. *Body*. *Back* and *sides*, vermiculated with dusky and white (vermiculations coarser than on male Green-winged Teal); *scapulars* like back, but with the longer feathers black and white, producing a black-and-white line along sides of back; (lacks vertical white bar on body in front of wing, present in male Green-winged Teal); *rump*, slaty brown; *chest*, pinkish buff, spotted with dusky; *breast*, whitish, often stained with rusty; *belly*, whitish, with fine vermiculations of dusky; black bar on *flank* at base of tail; *feet*, grey, greenish, or brownish; *webs*, dusky. *Tail*, slaty brown,

narrowly margined with whitish, undersurface, ashy; *upper coverts*, black or blackish, with ashy or creamy edgings on inner webs; *under coverts*, central feathers black, edged with whitish, outside ones, yellowish buff. *Wings*. *Coverts*, grey; greater coverts tipped with cinnamon buff; *primaries*, dull greyish brown, paler on inner webs, inner primaries tipped with whitish; *secondaries*, with *speculum* of glossy black outwardly, and metallic green inwardly, bordered in front with bar of cinnamon buff and behind with white on outer feathers; *tertials*, greyish brown, usually edged with whitish, outer tertial with black stripe on outer web, producing inner border to *speculum*; *lining*, pale grey, dusky along forward edge; *axillars*, white, occasionally with some grey speckling.

ECLIPSE PLUMAGE: Same as that of Green-winged Teal.

AUTUMN PLUMAGE: Adult males in early autumn commence a moult from the female-like plumage of the eclipse towards full winter plumage. The wing is as in winter plumage. In early stages the male may be identified by the presence of some of the reddish *head-feathers* of winter plumage and by the first traces of green colour behind the eye; a scattering of new, vermiculated feathers may be seen on the *back*, *scapulars* and *sides*. With the progress of autumn, the full winter plumage of the *head* is further developed, the vermiculated feathering on *back* and *sides* becomes more and more uniform, and the bird becomes more easily recognizable. Not until spring, in most cases, are the black-and-white *scapulars* taken on.

ADULT FEMALE. *Head*, without crest, and *neck*, whitish or buffy, streaked with dusky, giving mottled effect, darker on *crown*; *chin* and *throat*, white; dusky stripe through eye and, often, a small pale area at base of bill; *bill*, blackish, purplish grey at base and spotted with black, same shape as that of male; *eye*, dark brown. *Body*. *Back*, *scapulars* and *rump*, dusky brown, scalloped with buff, giving mottled appearance; *chest*, whitish or buffy, heavily spotted with dusky; *sides*, dusky brown, feathers broadly edged and marked with buffy white; *breast*, whitish; *belly*, obscurely spotted or mottled with pale grey; *feet*, same as those of male. *Tail*, slaty brown, narrowly margined with white; *upper coverts*, like back; *under coverts*, like belly but spots darker. *Wings*, same as those of male but slightly duller.

JUVENILE. Same as that of Green-winged Teal.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very small, beautifully marked, greyish duck, with crested red head and green face-patch. Chief distinguishing features (a) hind toe without lobe, (b) extremely small size, (c) horizontal white bar along line of shoulder above folded wing.

See "Specimen Identifications" of male Green-winged Teal.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very diminutive, mottled-brown duck, with whitish breast. Chief features (a) hind toe without lobe, (b) extremely small size (with the Green-winged Teal, the smallest of our ducks), (c) *speculum*, black outwardly, green inwardly, bordered in front with white and pale cinnamon buff, and behind with white.

See "Specimen Identification" of female Green-winged Teal.

FIELD MARKS

ON THE WATER OR IN FLIGHT. The field marks of the European Teal are similar to those of the Green-winged Teal. The male can be separated on the water from the male Green-wing by the prominent white line along each side of the back, and by the absence of the white crescent in front of the folded wing, which is present in that bird; these marks are noticeable on the water or on land, if viewed close at hand or with glasses. See Green-winged Teal.

VOICE. Like that of Green-winged Teal. Male, a soft single or double whistle; female, a weak, high sounding *quack*.

LIFE STORY

The European Teal, close kin to our Green-winged Teal, is widely distributed over the Old World, and is the common teal throughout Europe and Asia. It has occurred casually but frequently on the Atlantic coast of America, from Greenland to North Carolina.

For a long time it was not known to breed on this continent, and the Teal, which is a common breeder on the Aleutian Islands, had always been assumed to be our Green-winged Teal. Bent (1923) states, however, that in 1911 he found the European Teal to be a regular summer resident on these islands and that all of the breeding teals he collected there were of this species; not a single male Green-wing was collected or identified anywhere in the Aleutians. He drew the conclusion, therefore, that the European Teal is the common breeding species of this region and that the Green-wing, which is so abundant on the mainland of Alaska, occurs on these islands rarely, if at all.

It is probable that the European species, breeding on the Aleutians, migrates down the Asiatic coast to Siam and India with those of its kind that breed in Siberia. As teals in their migrations are inclined to stray from their regular routes, many of these birds no doubt visit the Pacific coast of America, but on account of their great similarity to our Green-wings (the females of the two species are indistinguishable) have been overlooked; teals taken in this locality should be examined and specimens of the European species should be reported to the Fish and Wildlife Service, Washington, D. C., or to the National Museum of Canada, Ottawa, Canada.

In its nesting habits, the number, size (average 1.76 by 1.28 inches) and colour of its eggs, in its manner of flight, general behaviour, and the choiceness of its flesh, the European Teal is the counterpart of our Green-winged Teal.

Green-Winged Teal

Nettion carolinense

(*Anas crecca carolinensis*, of Peters)

(nét-i-on, ka-ro-li-nén-se; á-nas, krék-ka, ka-ro-li-nen-sis)

Colour Plates Nos. 12 and 14. Downy Young No. 33.

SCIENTIFIC NAME

Nettion, Greek, meaning a duckling, a little duck, diminutive of *netta*, a duck; *carolinense* and *carolinensis*, Latinized forms, meaning of Carolina; *anas*, Latin, meaning a duck; *crecca*, Latin, to express the sound, crex, crake, quack.

COLLOQUIAL NAMES

IN GENERAL USE: Common teal; green-wing; teal; teal duck. IN LOCAL USE: Butterball; congo; congotte (also misspelled cognotte, refers to small size—Congo slaves were the smallest brought to the New Orleans market); lake teal; mud teal; partridge-duck; redhead teal; sarcelle (teal); sarcelle d'hiver (winter teal); spring teal; water-partridge; winter teal.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, chestnut, dusky on *chin*, *throat*, and *forehead*, with glossy green patch including eye and extending backward, separated from its fellow by black patch on hindneck, the green shading into black beneath and behind eye, and bordered with faint, buffy-white line often extending forward to base of bill; *crest*, chestnut, longer feathers purplish black; *lower neck*, like back; *bill*, black, about as long as head, small and slender; *eye*, brown. *Body*. *Back*, *scapulars* and *sides*, greyish, being finely vermiculated with dusky and white; some outer scapulars becoming black by spring; *rump*, slaty brown; *chest*, pinkish buffy, with round, blackish spots; a vertical white bar on side of body in front of wing; *breast*, white or buffy white, often stained with rusty; *belly*, whitish, with fine vermiculations of dusky; black bar on flank at base of tail; *feet*, bluish grey to olive grey, *webs*, darker. *Tail*, slaty brown, narrowly margined with white, *under surface*, ashy; *upper coverts*, black, with ashy edgings on inner webs; *under coverts*, central feathers, black, outside ones, yellowish buff. *Wings*. *Coverts*, grey; greater coverts broadly tipped with buffy brown; *primaries*, dull, greyish brown, lighter on inner webs, inner primaries tipped with whitish; *secondaries*, with *speculum* of glossy black outwardly and metallic green inwardly, bordered in front with bar of buffy brown and behind with white or buffy, lacking on inner feathers; *tertials*, brownish grey, sometimes edged with white, outer web, forming a black inner border to speculum; *lining*, white, dusky along forward edge; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse starts in June or July and is usually complete in August. The full-plumaged wing is renewed. The plumage is then very similar to that of the female, except that the spotting on underparts is less distinct. Eclipse male may be distinguished from juvenile male in having scapulars broader, with square instead of rounded tips, and breast unstreaked.

AUTUMN PLUMAGE: From the eclipse plumage, which resembles that of the female, the adult male commences, in September, a continuous moult toward the winter plumage. The wing is as in winter plumage. In early stages the male can

be recognized by the appearance of scattered chestnut feathers of the winter plumage on the *head*, with a few green ones behind the eye; new, finely vermiculated, grey feathers may be seen on the *lower neck*, *back*, *scapulars* and *sides*. In later autumn the black feathers of the *crest*, the dark *throat*, and chestnut-and-green *head-pattern* approach full plumage; vermiculated grey feathers of the *back* and *sides* also become more plentiful, and the white bar in front of wing is apparent. By late October the moult is usually complete, except for the black *outer scapulars*, which are not acquired until early spring.

ADULT FEMALE. *Head*, without crest, and *neck*, whitish or buffy, spotted and streaked with dusky, darker on *crown*; *chin* and *throat*, white; dusky stripe through eye; often small pale area at base of bill; *bill*, blackish, purplish grey at base, spotted with black, same shape as that of male; *eye*, brown. *Body*. *Back*, *scapulars* and *rump*, dusky brown, scalloped with buff, giving mottled appearance (*back* varies, some birds have considerable buffy barring on foreback); *chest*, whitish or buffy, spotted and mottled with dusky; *sides*, dusky brown, broadly edged and marked with buffy white; *breast*, white; *belly*, faintly mottled with pale grey; *feet*, pale greyish flesh to blue grey, *webs*, dusky. *Tail*, slaty brown, narrowly margined with white; *upper coverts*, dusky, edged with buff and with V-shaped buffy markings; *under coverts*, like belly but with dark markings. *Wings*. Same as those of male but duller; *coverts* usually with light edgings, greater coverts with less buff than those of male; green area of *speculum* reduced in size but not in brightness, and tipping on *secondaries* is white with no buff.

JUVENILE. In first plumage, up to September, sexes are alike and resemble adult female except in usually having more spotting on *belly*; upper *tail-coverts* of both sexes lack buffy marking of those of adult female, though these may be faintly indicated in young male. The change to maturity is rapid and by October the young male shows all indications of adult plumage; vermiculated feathers on *sides*, and chestnut plumage of *head* have appeared. Except for wing, practically fully adult by December. *Wing of Male*. As in adult male, sometimes somewhat duller; *tertials*, olive brown (brownish grey in adult) edged with buff; *greater coverts*, usually with narrower cinnamon tips. *Wing of Female*. As in adult female but *speculum*, generally duller, green area smaller.

Note. In these juveniles the sex may be determined by the dark streak on the tertial feather bordering the *speculum*; in the young male, this streak is intense and well defined, in the young female, it is dusky.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very small, beautifully marked, greyish duck with crested red head and green face-patch. Chief distinguishing features (a) hind toe without lobe, (b) extremely small size, (c) vertical white bar on side of body in front of wing.

This duck could be confused only with the male European Teal, which, however, lacks the vertical white bar and has instead a horizontal white bar along line of shoulder above folded wing. The buffy-white line bordering the green face-patch tends to be less white than similar line in the male European Teal.

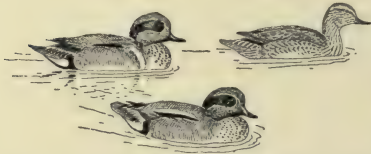
AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very diminutive, mottled-brown duck, with white breast. Chief features (a) hind toe without lobe, (b) extremely small size (with the European Teal, the smallest of our ducks), (c) *speculum*, black outwardly and green inwardly, bordered in front with pale brown and behind with white.

Not to be confused with any other duck except the female European Teal, from which it cannot be told with certainty. The tips of the greater coverts are usually a deeper buff in this species than in the female European Teal; in which they are very pale, almost white, while in the Green-wing they are brownish buff, the outer ones paler.

FIELD MARKS

ON THE WATER. The Green-winged Teals are the smallest of our ducks. Their small size will distinguish them from all except the other Teals and the little Buffle-heads. Both males and females appear shorter of body than Bluewings and have shorter necks. Size alone, however, is a poor means of identification unless small and larger birds are in mixed flocks. At close range the dark brown head of the male and the vertical, white crescent in front of folded wing will identify. Greenwings may often be seen loafing on sandbars and mud flats, where they sit preening their feathers and sunning themselves. The bright blue wingpatches of the Blue-winged Teal, the red colour of the Cinnamon Teal, and the conspicuous black and white markings of the Buffle-head will separate these other small ducks. The seldom-encountered European Teal is identical except that the male lacks the white crescent in front of the wing and shows instead a prominent, horizontal white line along side of the back above folded wing.



*Green-winged Teals in background.
Male European Teal in foreground.*

IN FLIGHT. The flight is exceedingly rapid, in large, compact flocks, wheeling and circling like a dense flock of pigeons. By their erratic flight and small body size they may be told on the wing. The wings make an audible whistling sound in flight. When flushed from ground or water, they spring vertically upward to a considerable height before levelling off. In poor light, when the blue wing-patch of the Blue-winged Teal cannot be observed, it is not possible to separate the two species.



VOICE. Male, a short, mellow whistle or twittering call; a high-pitched, short, staccato whistle, sometimes accompanied by a lower-pitched, trilled note; a note like that of a spring peeper frog. Female, a high-pitched, off-repeated *quack* of slight volume; when surprised, *kup-kup-kup*; when curious, *ek-ek-ek*. Courtship voice of the male is a soft, not unmusical, *pheep pheep*.

LIFE STORY

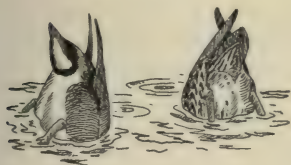
The drake Green-winged Teal, in the eyes of many, ranks second only in charm and beauty to the gorgeous Wood Duck. A wealth of delicate loveliness is blended on the tiny person of this, the smallest of our wild fowl.

"Following close on the heels of the Pintail and the Mallard, the hardy little Green-winged Teal is one of the earliest migrants to start in the spring for its northern breeding grounds. It begins to leave its win-

ter haunts in the lower Mississippi Valley in February, proceeding slowly northward, and the first arrivals appear in its summer home in northern Alaska early in May. . . . Although the breeding range of the Green-winged Teal extends much farther north than that of the Blue-winged Teal, its center of abundance in the nesting season is in the vast prairie regions of the Northern States and western Canada. . . . The fall migration begins with the first cold weather, often quite early in the season, but the birds linger on the way wherever they can find attractive feeding grounds in the wild rice patches or on cultivated lands. . . . The first snowstorms bring along the main late flight and the northern winter has set in before the last of the migrants are driven south by the ice and snow, together with the northern Mallards, the last of the Surface-feeding Ducks. . . . This hardy little duck winters as far north as British Columbia and Montana in the west, in the central States of the prairie region, in southern New England and even in Nova Scotia, when it can find open water in the spring holes and the streams near the coast. But its main winter home is in the great wild-fowl resorts of the Southern States and Mexico, where it can find safe retreats and abundant feeding grounds. It prefers the rice fields of the interior and the inland sloughs and ponds, but it also visits the coastal estuaries and the mouths of streams occasionally" (Bent, 1923).

The same writer says: "Nearly every writer on American ornithology has commented on the swiftness of flight of the Green-winged Teal, in which it certainly excels. In proportion to its size, and perhaps actually, it is the swiftest of the ducks, though its diminutive size might lead to an overestimate of its speed. It has been credited with a speed of 160 miles an hour, but this is undoubtedly an exaggeration." Bowles (1909) says: "Moving at a rate of certainly not less than 100 miles an hour, the evolutions of a large flock of these birds are truly startling. They fly in such close order that one would think their wings must interfere, even on a straight course; yet of a sudden the whole flock will turn at a right angle, or wheel and twist as if it were one bird. The looker-on can only wonder what the signal may be which is given and obeyed to such perfection, for the least hesitation or mistake on the part of a single bird would result in death or a broken wing to a score." (In the section dealing with the Speed of Flight will be found some interesting facts regarding the flight speed of this and other species, which are the result of recent studies.)

The Green-wing is a duck of the inland sloughs, marshes, and streams where it feeds by reaching down to sift its food from the muddy bottom or to pluck the weeds that flourish in these shallow places. It feeds by tipping and may often be seen kicking its feet in the air to help maintain its balance. It is active on land, runs quickly, and often wanders far from water in search of berries, acorns, chestnuts, and the like. About nine-tenths of the food of this duck is vegetable. Its average diet, as shown by the examination of the stomach contents of 653 specimens.



gave the following approximate percentages: sedges, 39; pondweeds, 12; grasses, 11; smartweeds, 5; algae, 5; duckweeds, 2; water milfoils, arrow grass and burr reed, 3; miscellaneous plant food, 14; total plant food, 91 per cent. Insects, 5; molluscs, 4; total animal food, 9 per cent. Unlike the Blue-winged and Cinnamon Teals, which are more fastidious, the little Green-wings love the maggoty flesh of the rotting salmon of the Pacific coast, and, when so feeding, are practically unfit for human consumption.

The following account of the curious courtship display of the Green-wing is condensed from an account by Sutton, quoted by Bent (1923): A female, accompanied by two males, was resting in a pond when suddenly the two males started to swim about the pond in poses which were ridiculously similar; the bills were pointing somewhat upward and the heads drawn back in a stiff and uncomfortable-looking manner. Strange as it may seem, so similar were the birds in their every movement, that even the feet seemed to stroke in perfect harmony and the picture was one of unusual beauty. Back and forth they swam, then, still in perfect harmony of movement, they started swimming in a circle around the female, keeping about two feet apart, and at a tantalizingly deliberate speed. The female all the while appeared utterly unobservant. The males suddenly started a remarkable series of bobbings, opening their bills widely and uttering a musical *pheep, pheep*; all the while they kept wheeling in a circle about six feet in diameter. The female suddenly made a rush at one of the males, whereupon he stood up in the water, lifted his wings slightly, and with rapidly churning feet made a most unusual noise, like a fine jet of water impinging on some object; as soon as this happened he settled to rest for a while and the other male arose and repeated the performance; occasionally both would perform the antic at the same time. The attitude of the males toward one another throughout the entire display was always one of dignified tolerance and, while they vied with one another in matters of elegance of movement, there was never any sign of combat.



The nest, a pretty structure, is usually placed in the long grass near the borders of lakes or sloughs but is frequently found a long way from water, concealed at the base of some shrub, or clump of willows. It is built in a hollow in the ground carefully lined with soft grasses, weeds, leaves, and down from the breast. As incubation proceeds, down is added and forms a blanket which covers the eggs and keeps them warm during the mother's absence. The Green-wing is a prolific bird and as many as 18 eggs may be laid; the usual number, however, is from 10 to 12. They are dull white, cream, or pale olive buff in colour and cannot be told from those of the Blue-winged Teal. The average size is 1.80 by 1.35 inches. Incubation lasts from 21 to 23 days and, as the drake deserts the female as soon as the eggs are laid, upon the mother devolves the care and upbringing of the family.

From the culinary standpoint there is no more succulent morsel than the little Green-wing. Always fat, tender, and juicy, its flesh is rated as the last word in gastronomic delicacies. Twenty minutes in a very hot oven is ample, and an entire duck to each helping!

Not only on account of its super table-qualities is it valued by sportsmen. Although Teals decoy readily, their flight is so erratic and so fast that they provide a real test of the gunner's skill. Before dropping in among the decoys they pass and repass the danger spot, circling and twisting in dense flocks. Even after being shot at they rise, circle again and often drop in once more, this time among the floating bodies of their comrades who have fallen to the first fusillade. In rising from the water they spring vertically into the air and make off with the speed of swallows. They are frequently mentioned as among the fastest of fliers but their diminutive size gives the illusion of a flight even faster than it really is. Quick as they are on the wing, their habit of flying in dense, closely-bunched flocks renders them vulnerable to the fire of the gunner, and two or more birds will often fall to a single shot. They are easily killed.

Blue-Winged Teal

Querquedula discors

(*Anas discors*, of Peters)

(kwer-kwéd-u-la, dís-kors; á-nas)

Colour Plates Nos. 13 and 14. Downy Young No. 33.

SCIENTIFIC NAME

Querquedula, Latin, the name of a kind of small duck; *discors*, Latin, meaning discordant. *Anas*, Latin, meaning duck.

COLLOQUIAL NAMES

IN GENERAL USE: Blue-wing; teal; or teal duck. IN LOCAL USE: Autounière (autumn teal); sarcelle d'été (summer teal); sarcelle printannière (spring teal.)

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, slate grey, with purplish and greenish gloss; *forehead*, *crown* and *chin*, black; crescent-shaped white patch, bordered with blackish, in front of eye, extending from above eye to side of throat. This patch has a tendency to extend back well over eye, tapering off in some cases to a narrow, indistinct white streak along side of crown and hindneck. Where those from the two sides of head they may join; *bill*, bluish black, about as long as head, same width throughout; *eye*, brown. *Body. Back*, feathers grey brown, with U-shaped light buffy markings; *scapulars*, like back but some of outer ones blue, others greenish black, streaked with buff; *rump*, dark olive brown, feathers with paler edges; *chest*, *breast*, *belly* and *sides*, pale reddish cinnamon, marked with round black spots, sometimes forming bars on breast and belly; *sides* at rear, broadly barred with black instead of spotted; white patch on each *flank*; *feet*, dull yellow to yellow orange, with dusky *webs*. *Tail*, blackish brown, narrowly margined with buff; *upper coverts*, like rump; *under coverts*, blackish. *Wings. Lesser and middle coverts*, cobalt blue; *greater coverts*, outer ones, white, though ashy at base, inner ones, slaty blue, tipped with white; *primaries*, dark brown, paler on inner webs; *secondaries*, with iridescent green *speculum*, bordered in front with white, very narrowly edged with white behind, and bordered on either side with blackish; *tertials*, greenish black, streaked with buff; *lining*, white, with some brownish; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse starts in June and is at height in August. The full-plumaged wing is renewed. The eclipse plumage lasts through September and resembles the female plumage except for the wings.

AUTUMN PLUMAGE: Not until late October or November does the adult male commence to moult out of the female-like plumage of the eclipse into full winter plumage. The wing is as in winter plumage. In early stages there is a faint indication of the white crescent before the eye; and the first new reddish-cinnamon feathers appear on *breast* and *belly*. Later, when the white crescent shows clearly, the purplish and black feathers of winter plumage can be seen on *head* and *neck*, and the white patch on *flank* may be looked for; the *breast* and *belly* also show increasing amounts of the reddish-cinnamon winter dress. Usually not until March is the adult male in full winter or breeding plumage, being much the slowest species of the Pond Duck group in attaining this plumage.

ADULT FEMALE. *Head* and *neck*, greyish buffy white, streaked with dusky, darker on *crown*, a dusky line from bill through eye; *cheeks*, buffy white, and finely streaked; *chin* and *throat*, and area at base of bill, whitish; *bill*, dusky,

paler and spotted at base, edges of both mandibles yellowish flesh colour; *eye*, dark greyish brown. *Body*. *Back and rump*, dark olive brown, feathers edged with pale buffy, feathers of back with U-shaped buffy markings; *scapulars*, same as back, but with more pronounced buffy edgings; *chest and sides*, brown, feathers broadly edged with buffy white; *breast*, white; *belly*, whitish, mottled with greyish brown; *feet*, dull yellowish, with dark *webs*. *Tail*, dusky, feathers narrowly edged with buffy; *upper coverts*, olive brown, margined with buff, like back; *under coverts*, like breast. *Wings*, like those of male, except blue of *lesser and middle coverts* duller; *greater coverts*, slaty, tipped with white; *speculum*, dull blackish, glossed with green, and narrowly tipped with white; *tertials*, brown, with lighter edgings.

JUVENILE. In early autumn sexes are alike, and resemble adult female, except that the *breast* is mottled and streaked with greyish brown; feathers of *back* and *upper tail-coverts* lack U-shaped buffy markings, though in young males these may be faintly indicated and tend to be transverse; *feet* greyish, becoming yellowish later in autumn. During autumn and winter further changes to maturity are slow, and not until spring is the adult plumage approached and, even then, the colours are duller and the blue-edged *scapulars* of the male are undeveloped. Fully adult plumage in second autumn. *Wing of Male*. As in adult male but *tertials*, sepia (instead of greenish black) edged with buff; *speculum*, usually somewhat duller; *greater coverts*, with narrower white tips. *Wing of Female*. As in adult female but *tertials*, duller and browner; *greater coverts*, with much less white, often with dusky spots and bars.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very small, pinkish-cinnamon duck, marked with round, black spots, and with a dark head. Chief distinguishing features (a) hind toe without lobe, (b) slate-grey head, with white crescent-shaped patch in front of eye, (c) large, cobalt-blue patch on forewing.

Its small size will prevent confusion with any of the River and Pond Ducks, except the other Teals; its blue wing-patch will distinguish it from the Green-winged and European Teals; its plumage and white face-patch will distinguish it from the Cinnamon Teal.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very small, mottled, buffy-brown duck, with a white breast. Chief features (a) hind toe without lobe, (b) very small size, (c) large, blue patch on forewing.

The blue wing-patch will distinguish it from the other female Teals except the female Cinnamon Teal, from which this species cannot be positively distinguished. The bill of the Blue-wing is smaller than that of the female Cinnamon, and is the same width throughout, while in the latter, the bill is slightly constricted towards the base (fig. 42). The Cinnamon is often more reddish on the underparts, but as certain waters impart a rusty stain to the white breasts of many ducks this means of distinction is of doubtful value. The female Shoveller is of somewhat the same general coloration and has a similar blue wing-patch, but is larger and may always be told by its huge, spatulate bill.

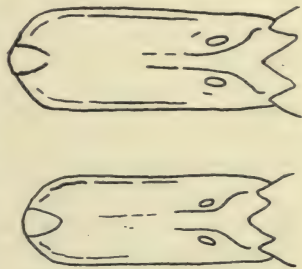


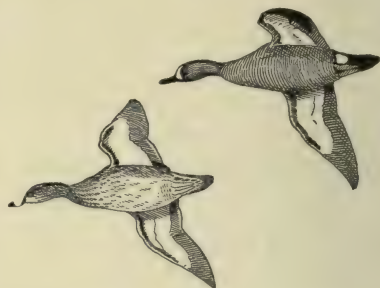
FIG. 42.—Above, bill of female Cinnamon Teal. Below, bill of female Blue-winged Teal.

FIELD MARKS

ON THE WATER. The Blue-winged Teal is almost as small as the Greenwing, and its diminutive size will distinguish both sexes from all ducks except the other teals and the little Buffle-head; size alone, however, is a poor identifying feature in the field except when small and larger ducks are observed in mixed flocks. The bright-blue wing patch of both sexes is the best distinguishing feature and will separate them from the Green-winged and European Teals; the red colour of the male Cinnamon and the conspicuous black-and-white markings of the Buffle-head will prevent confusion with those species. At close range the white crescent on side of the face of the male Blue-wing is quite noticeable, as is also the white patch on each flank near base of tail. The female can be told from the female Green-wing by the blue wing-patch but cannot be distinguished from the female Cinnamon Teal. The female Shoveller is similarly marked, but its larger size and large bill will separate.



IN FLIGHT. These ducks fly with great speed, in close flocks and with many twisting and turnings, darting hither and thither with the speed of swallows. They rise from land or water vertically into the air with great agility. The blue wing-patch of both sexes is noticeable in flight, but in bright light appears almost white. In poor light flocks cannot be distinguished from the other teals, though by their erratic flight and twitterings and chirpings, they can be told from all other species even in very dim twilight.



VOICE. Silent when feeding. On the wing males uttered a whistling *peep*, oft' repeated; a soft, lisping note, *tseef, tseef, tseef*; females, a faint *quack*, less plain or forcible than that of the female Green-wing.

LIFE STORY

The tender little Blue-winged Teal is exclusively a New World species. It is a bird of the inland marshes, ponds, and sloughs, seldom visiting the sea coasts; plentiful in the east, and still more abundant in the interior, it is hardly ever encountered on the Pacific coast. The Blue-winged and Cinnamon Teals are more closely related to each other than they are to the other teals, and the marked similarity of these species to the Shoveller is dealt with fully in the "Life Story" of that bird.

"Not until spring is well advanced and really hot weather has come in its winter haunts does this tender warm-weather bird decide to leave the sunny glades of Florida and the bayous of Louisiana, where it has spent the winter or early spring, dabbling in the shallow, muddy pools and marshes. The early migrants are probably hardier individuals that have wintered farther north, but the later migrants linger in the Gulf States through April and even into May." In the autumn, "as soon as

the young are able to fly, or even before that, they begin gathering into flocks, preparing for the fall migration, which begins with the first early frosts in August and is mainly accomplished during September, for these delicate birds are very sensitive to the approach of autumn and are the earliest ducks to migrate." In the winter they are "abundant in some parts of the South, where they make their winter home in the great rice fields and extensive marshes, feeding on the ripened grains that fall upon the water, feasting and growing fat. Here they are safe enough as long as they paddle about and remain hidden in the innermost recesses of the rice fields and inaccessible swampy pools" (Bent, 1923). The winter is spent farther south than is the case with any other North American duck, and although large numbers of these birds do remain in the marshes of the Southern States, the majority spend the winter in northern South America, as far south as central Chile and Brazil.

Teals, and the Blue-wing is no exception, are delicious table birds; they seem always to be fat, juicy and tender and are generally considered to be the choicest of the lot. The gunner looks for the Blue-wing about the full of the moon in September; it is the earliest of migrants and constitutes the main portion of the bag at the beginning of the shooting season. Many of the old males leave for the south before August and the bag in



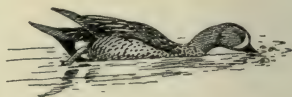
September shows a high proportion of females and juveniles. No duck decoys more willingly than the Blue-winged Teal and it will drop in as readily to wooden decoys as to live ones. Flying in large, closely-bunched flocks, presenting an easy target in spite of their exceedingly swift flight, they circle and twist as they pass and repass the decoys before splashing in. Even in the dusk or early twilight flocks may be recognized by their erratic flight, the sibilant sound of the wings, and by the softly whistled twitters of the birds as they fly. In rising from land or water they spring vertically into the air with characteristic agility; they swim in closely-bunched groups, so closely that they often seem to be touching.

The courtship of these teals appears to consist of a nuptial flight somewhat after the style of the Black Duck, and during the breeding season they may be seen coursing over and around the ponds in couples or three's and may be identified by their swift flight with its many evolutions. Bennett (1938) says that the most interesting phase of the courtship, however, takes place on the water and along the beaches or mud flats. The males and females, or male and female, swim slowly about, bowing to each other. "The head and neck of the bowing birds went up and down and slightly outward. As many as 31 bows per minute were recorded for several minutes at a time. The swimming around each other and bowing took place for hours at a time, interrupted with feeding and resting periods. At times one male chased another male away from the female. Prior to the chasing, both males and the female often courted for hours before dissension arose."

The nest of the Blue-wing exhibits a wide diversity of construction. It is usually a neat, basket-like structure composed of fine, soft, dead grass, lined with down and placed in a hollow in the ground with the top of the nest flush with the surface. It is seldom far from water and is generally well concealed in the long prairie grass growing in the vicinity of the sloughs and ponds. From 6 to 15 eggs are laid, but ordinarily from 10 to 12 comprise the set. The eggs vary in colour; they are dull white, creamy white, or pale olive white, and are indistinguishable from those of the other teals. The average size is 1.83 by 1.31 inches. The period of incubation is from 21 to 23 days and is performed by the female alone as the male deserts her once incubation is well started. During the egg-laying period and the early days of incubation the male usually waits for the female on some nearby marsh or pothole. He establishes regular waiting spots, on boulders, logs, or muskrat houses, or he will be found standing or sitting hour after hour along the shore. In returning to her nest, the cautious little mother will generally alight at a distance and sneak through the grass and weeds towards it rather than advertise its location by a direct approach. Being late migrants in the spring, these teals are late breeders and the young develop exceptionally rapidly in preparation for their migration in the early autumn; during August the wing and tail feathers are acquired and before the end of that month the young birds are well developed and, as a rule, by the time they are six weeks old they have begun to fly.

Bent (1923) says: "The young are guarded with tender care by one of the most devoted of mothers; when surprised with her brood of young she resorts to all the arts and strategies known to anxious bird mothers to draw the intruder away from her brood or to distract his attention, utterly regardless of her own safety, while the young have time to hide or escape to a place of safety. The young are experts at hiding, even in open situations, where they squat flat on the ground and vanish; but they usually run or swim in among tall grass or reeds, where it is almost useless to look for them. All through the remainder of the summer, until they are able to fly, she remains with them, teaching them where to find the choicest foods and how to escape from their numerous enemies; they learn to know her warning calls, when to run and when to hide, and by the end of the summer they are ready to gather into flocks for the fall migration."

The Blue-wing is strictly a surface feeder and finds its sustenance in the shallow muddy ponds, creeks, and ditches, and along the reedy shores of lakes and sloughs. Unlike most of the other Surface-feeding Ducks it rarely "tips," tail and feet uppermost, when feeding, but more often, merely reaches down to the extent of its head and neck in the more shallow places. It is very fond of wild rice, and occasionally visits the stubble fields of barley and wheat to glean what it can be of the fallen grain. It seems to be somewhat more of an animal feeder than the Green-wing, for whereas the vegetable food of that species averages about nine-tenths of its diet,



that of the Blue-wing appears to be only about seven-tenths as shown by the following figures. The stomach contents of 315 of these birds, from 29 States and 4 Canadian Provinces and taken in every month of the year except January, the majority being autumn birds, gave the following approximate percentages: sedges, 19; pondweeds, 13; grasses, 12; smartweeds, 8; algae, 3; water lilies, 1; rice and corn, 1; water milfoils, 1; miscellaneous plant food, 13, total vegetable food, 71 per cent. Molluscs, 17; insects, 10; crustaceans, 2; total animal food, 29 per cent. The animal food of the Green-winged Teal amounts to 9 per cent of its diet so that the Blue-wing consumes more than three times as much animal food as does that species.

Of the flight of these birds, Bent (1923) says: "From the water the Blue-winged Teal springs into the air with surprising agility, and when under way is one of the swiftest of the ducks in flight; it has been credited with attaining a speed of 90, 100, or even 130 miles an hour, but probably these speeds are all overestimated, as there is very little accurate data on which to base an estimate." Yorke (1899) says: "They travel at the rate of about 130 miles an hour, exceeded only by the Green-winged Teal." Audubon (1840) says: "The flight of the Blue-winged Teal is extremely rapid and well sustained. Indeed, I have thought that, when traveling, it passes through the air with a speed equal to that of the passenger pigeon." Bennett (1938) says: "Many fantastic tales of the flying speed of ducks have been told since man first became interested in them. The Blue-winged Teal



has always been regarded as a very fast flier. Its small size further accentuates its speed in the eyes of the casual observer. It was found by checking the speed of these birds with automobiles that rarely did the speed range over 45 miles per hour. On one occasion two birds were paced at 48 miles per hour. Most of the migrating birds observed were traveling at varying speeds between 30 and 40 miles per hour." Lincoln (1936), recorded one of these teals that was banded in Quebec, Canada, on September 5th, 1930, and was killed on October 2nd, 1930, in British Guiana, an airline distance of about 2,400 miles from the point of band-

ing. The bird flew at least 85 miles a day for 28 days to cover the distance in that length of time.

Of the future of the Blue-winged Teal, Bennett (1938) says: "Since 1900 about 90 per cent of the Blue-winged Teal breeding habitat has been eliminated in the United States by drought, drainage, and agriculture. About 50 per cent of the breeding range in Canada has been destroyed by the same factors. . . . The federal and state governments and private organizations have set up refuges along the lines of migratory movement that have been beneficial to the Blue-winged Teal during the spring and fall flights. The shooting areas in the past have outnumbered by far the refuge areas. . . . It is certain that the present refuges are inadequate. The United States has but little control over the Blue-winged Teal on the wintering grounds, as at least 95 per cent of the birds winter south of the southern boundary." The United States has a migratory bird treaty with Mexico but "it will take years to impress the people of Mexico to abide by the provisions in that treaty. . . . In countries, such as Mexico, where the Blue-winged Teal is heavily hunted, adequate wintering-ground refuges should be established."

Cinnamon Teal

Querquedula cyanoptera

(*Anas cyanoptera cyanoptera*, of Peters)

(kwer-kwéd-u-la, si-an-óp-ter-a; á-nas)

Colour Plates Nos. 13 and 14. Downy Young No. 33.

SCIENTIFIC NAME

Querquedula, Latin, the name of a kind of small duck; *cyanoptera*, from Greek *kuanos*, meaning blue, and *pteron*, meaning wing. *Anas*, Latin, meaning duck.

COLLOQUIAL NAMES

IN LOCAL USE: Blueing; blue-winged teal; red-breasted teal; red teal; river teal; silver teal.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, rich, dark cinnamon red, with blackish *crown*; *chin*, brownish black; *bill*, black, sometimes pinkish on lower mandible, longer than head and narrow; *eye*, orange. *Body. Foreback*, dusky, marked with cinnamon red, *hindback*, dusky brown, with lighter edgings and a few cinnamon-red markings; *rump*, dusky brown, with lighter edgings; *scapulars*, shorter ones, cinnamon, marked with black, longer ones, dusky brown, marked with buffy, greenish black and cinnamon, outer feathers blue; *chest* and *sides*, rich cinnamon red, shading into blackish brown on *breast*; *belly*, like breast, but often barred with black; *feet*, dull orange yellow, *webs* dusky. *Tail, upper surface*, blackish brown, edged

with buff; *under surface*, ashy; *upper coverts*, like rump; *under coverts*, brownish black. *Wings*. *Lesser and middle coverts*, cobalt blue; *greater coverts*, outer ones, white, inner ones, slaty blue, tipped with white; *primaries*, dark brown, paler on inner webs; *secondaries*, with metallic-green speculum, bordered in front with white, narrowly edged behind with white and bordered with blackish on inner and outer borders; *tertials*, blackish brown, striped with buffy; *lining*, white and brownish; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse starts in June and is at its height in August. This plumage is generally similar to that of the female, but *head and neck* are richer cinnamon buff, as are also edgings to body feathers; the wings are as in the winter plumage.

AUTUMN PLUMAGE: In September the adult male commences to moult out of the female-like eclipse plumage into full winter dress. The wing is as in winter plumage. The new cinnamon-red feathers appear first on the *chest* and their presence will identify the male bird in the early stages of the moult. The moult continues in progressive stages until the full winter plumage is regained in October or November.

ADULT FEMALE. Identical with female Blue-winged Teal, except for certain bill characters described under "Specimen Identification" below.

JUVENILE. In first autumn sexes are alike and resemble the adult female, except *under surface* of body is less suffused with cinnamon and is more streaked. During winter the young male gradually assumes adult plumage and by spring is practically adult, except that the *breast* is still dull brown and the colours generally are less brilliant. Fully adult plumage in second autumn. *Wing of Male*. As in adult male but *speculum* is duller. *Wing of Female*. As in female Blue-winged Teal.

SPECIMEN IDENTIFICATION

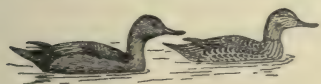
MALE. WINTER PLUMAGE: General effect: A very small, cinnamon-red duck, with a bright-blue wing-patch. Chief distinguishing features (a) hind toe without lobe, (b) dark cinnamon-red plumage, (c) cobalt-blue wing-coverts.

Difficult to mistake male for any other species.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very small, mottled, buffy-brown duck, with whitish breast. Chief features (a) hind-toe without lobe, (b) very small size, (c) cobalt-blue wing-coverts.

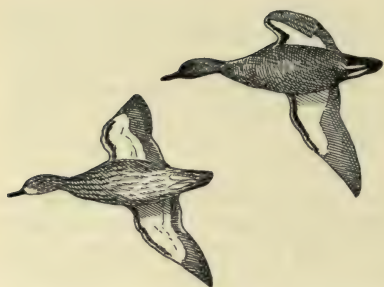
The blue wing-patch separates it from the other female teals except the female Blue-winged Teal, from which this duck is difficult to distinguish; bill is longer than that of the Blue-wing and more constricted at base (fig. 42). The Cinnamon Teal often has more reddish underparts, but as this may be due to



the rusty stain imparted by some waters to the white breasts of many ducks, it cannot be relied upon as a certain means of distinction.

FIELD MARKS

ON THE WATER. The small size and general redness of head, neck and body



the males and the blue wing-patches of

both sexes.

VOICE. Very silent birds; male, a low, rattling, chattering voice of poor carrying-power; female, a simple, mild, *quack*.

LIFE STORY

Among the River and Pond ducks the Cinnamon Teal is the only North American species that is confined in its range to the western portion of the continent. The centre of its abundance is west of the Rocky Mountains and it is only rarely encountered east of this divide. Strangely enough it was first recorded, in 1849, far from its home, near the town of Opalouzas in Louisiana, in which state it is not now known. It is unique also in that it has two distinct populations in the New World, one in western North America, as above, and the other in southern South America divided by a distance of some 2,000 miles, but no migration takes place between these two widely separated ranges.

This teal and the Blue-wing seem to be more closely related to each other than they are to the other teals. As a matter of fact, both of these ducks are closely allied to the Shoveller, and the points of similarity between the three are dealt with fully in the "Life Story" of that bird. The female Cinnamon and the female Blue-wing are distinguishable only by minor differences in width of bill and unreliable and hardly noticeable shades of coloration. The ducks themselves know the difference, however, as even in captivity crosses between the two species are unknown.

These teals inhabit the tule bordered shallow edges of the lakes and marshes of their western range where the families find ample cover from their many natural enemies. They are seldom encountered associated in large flocks and are usually found in pairs or, after the breeding season, in family parties, and may be seen paddling quietly in and out of the rank vegetation, busily feeding along the surface as they go. They are rather tame, confiding birds and will allow a close approach before taking flight; even then they will alight almost immediately at no great distance away. When by themselves they are very playful, chasing one another and splashing around in the most joyous manner. When so romping the males may be observed playing "leap frog"—one will rush at the other, leap over him and alight in the water just ahead; the hindmost will take his turn at the leap and so on.

The courtship display of this species, condensed from an account by

of the male will readily identify these teals. the blue wing-patch of the female separates it from the female Green-winged and European Teals, but not from the female Blue-winged Teal, from which it cannot be told in the field. The female Shoveller, which has a similar blue wing-patch and the same general coloration, is separated by its very large bill.

IN FLIGHT. The style of flight is similar to that of other teals, but flocks are readily recognized by the red colour of

Dawson, quoted by Bent (1923), is about as follows: Six or eight Cinnamon Teal were observed disporting themselves and indulging in their courting antics on a secluded little pond entirely surrounded by reeds. One of the males started to follow his intended very closely, bobbing his head by alternately extending and withdrawing his neck in a lively fashion; occasionally only, would the female respond in a similar manner. Finally, aroused from her pretended indifference, the duck acknowledged her suitor with emphatic bobs of the head and immediately thereafter joined him in chasing away the discredited rivals. During the performance the males were repeatedly charging upon each other with open beaks but no bodily harm was inflicted in these attacks. J. G. Tyler, quoted by Bent (1923), says that the males "occasionally, but not often, plunge below the surface of the water during the mating season; this feat usually being accomplished in the presence of a rival."

There is great variety in the site chosen for the nest by this species and the nest itself varies considerably in its construction. The nests range from neat basket-like structures, woven skilfully of soft grasses and carefully concealed in heavy reeds, to mere depressions in the ground, scantily lined with bits of trash and without any thought of concealment; no matter what the nests may be like they are always very heavily lined with down from the mother's breast. The nest may be found in the reeds just above the surface of the water or it may be located 100 feet away from water on the dry land. The better kind of nest, on the ground near water, is the more usual. The Cinnamon Teal lays from 6 to 14 eggs, the usual number being 10 to 12; the colour is either pure white or pale pinkish buff and the average size is 1.87 by 1.36 inches. Incubation is performed entirely by the female but she is not always deserted by the male, as is usual in the duck family. It is common to see broods of young ducklings accompanied by both parents; on the approach of danger the male is the one which appears to show the greater degree of solicitude for the welfare of the ducklings, especially as they grow older.

The manner in which the young ducklings, when alarmed, scatter and hide is related in Schneider (1893) who quotes A. M. Shields as follows: Shortly after the ducklings are hatched "the mother duck (joined by her mate) escorts the young brood to the nearest body of water and manifests the greatest solicitude for the welfare of the little fellows, giving a signal upon the slightest approach of danger, which is followed by the almost instant disappearance of the entire brood, as if by magic. If on the shore they disappear in the grass; if on the water, they dive, and that is generally the last seen of them, for the time being at least, as they swim under the water for great distances until reaching the edge of the stream or pond, where they imperceptibly secrete themselves among the water moss or grass. I once watched a little fellow as he made his way under the clear water. He went straight for a little bunch of floating moss, and by gazing intently I could just distinguish the least possible little swelling of the moss; a small lump, as it were, about the size of a marble. He had come to the surface (as intended) under the patch of moss, and his head and bill were responsible for the little hump in the moss."

Referring to these teals, Vernon Bailey (1902), says: "The young are protected in the tule cover until old enough to fly, but they have many enemies. The prowling coyote dines with equal relish on a nestful of eggs or an unwary duck, and there are hawks by day and owls by night. The teals could hold their own against these old enemies, however, but a new danger has come to them in the form of the unrestrained market hunter. He goes to the breeding ground just before the young can fly and while the old ducks are molting and equally helpless, and day after day loads his wagon with them for the train. This wholesale slaughter has gone on until some of the breeding grounds have been woe-fully thinned not only of teal, but of other ducks.



Without speedy and strenuous efforts to procure and enforce protective laws, many species of ducks that breed principally within our limits will soon be exterminated." Where would our wild fowl be to-day had not market hunting been prohibited?

The Cinnamon Teal consumes vegetable substances to the extent of about four-fifths of its food. It is entirely a surface-feeder and the feeding operations are carried out for the most part along the margins of the ponds or even out on the banks. An examination of the stomach contents of 41 of these teals collected during the eight months from March to October, and from over its entire North American range, gave the following approximate percentages: sedges, 34; pondweeds, 27; grasses, 8; smartweeds, 3; mallows, 2; goosefoot family, 1; miscellaneous plant food, 5; total vegetable food, 80 per cent. Insects, 10; molluscs, 9; miscellaneous, 1; total animal food, 20 per cent.

In its habits and behavior the Cinnamon greatly resembles its near relative the Blue-wing; its style of flight is the same and its flesh is just as desirable; as a game bird it is popular with the gunners of the West. In the autumn the Cinnamon Teal has not far to travel as its breeding and winter ranges overlap and the migration is merely a shift from the northern portion of its range to the southern, and is accomplished during September and October. In the spring the return journey is undertaken in March and April.

Shoveller*Spatula clypeata*

(spát-u-la, klip-e-á-ta)

Colour Plates Nos. 15 and 17. Downy Young No. 33.

SCIENTIFIC NAME

Spatula, Latin, meaning a spoon; *clypeata*, Latin, meaning a shield; both words referring to the shape of the bill.

COLLOQUIAL NAMES

IN GENERAL USE: Spoonbill; spoonbill duck; often shortened to spoony. IN LOCAL USE: Broadbill; broad-faced mallard; broady; cowan; cow-frog; featherbed; French teal; Jew duck; laughing mallard; loffel-ente (spoon-duck); mesquin (micoine and mecoine are corruptions of mesquin); mud duck; mud-lark, mud-shoveler; mule duck; salt-water mallard, scooper; shovellbill; shovelmouth; shovelnose; soup-lips; spoon-billed teal; spoon-billed widgeon.

DESCRIPTION

ADULT MALE: WINTER PLUMAGE: *Head* and *neck*, iridescent green, with blue reflections; *throat* and *crown*, and area around bill, dull brownish black; *bill* (fig. 43) black, lower mandible paler, spoon-shaped, much longer than head; width near tip about twice as wide as at base, average length $2\frac{3}{4}$ ", width at base $\frac{5}{8}$ " widening to about $1\frac{1}{4}$ " near tip; lamellae conspicuously developed, long and bristle-like; *eye*, bright yellow. *Body*. *Chest* and *foreback*, white, chest sometimes stained rusty or slightly spotted; broken brownish-black streak dividing white on lower *hindneck*; *back*, slaty brown, with lighter feather-edgings; *scapulars*, mainly white, the longer ones, some with outer webs, greenish black, others, cobalt blue; *rump*, black, glossed with green; *breast*, rich chestnut, occasionally mottled with whitish; *sides*, paler reddish buff, finely vermiculated with black; *belly*, paler chestnut; broad patch of pure white on *flank* at base of tail, sometimes vermiculated with black; *feet*, orange red to vermillion. *Tail*. Central feathers dusky brown, with pale edgings, outer feathers becoming whiter; *upper coverts*, black, glossed with green; *under coverts*, shorter ones, bordering white flank-patch, whitish or buffy, finely barred with black, longer central feathers, brownish black, with green gloss, lighter brown at tips. *Wings*. *Lesser* and *middle coverts*, cobalt blue; *greater coverts*, greyish, with broad white tips; *primaries*, dusky; *secondaries*, with *speculum* of bright metallic green, borders in front with white bar, and behind, sometimes narrowly, with white; *tertiaries*, greenish black, streaked with white; *lining*, white, with some dusky feathers; *axillars*, white.

ECLIPSE PLUMAGE: The moult into the eclipse starts in June and is very rapid. In this plumage the male closely resembles the female, except for the breast, which remains largely chestnut, but is paler than in the winter male, and resembles the breast of the young male; the wings do not change the male pattern. The bill during eclipse becomes yellowish brown.

AUTUMN PLUMAGE: The moult out of the eclipse plumage, in which the male closely resembles the female, is very protracted, and in early autumn most males are still found in this eclipse plumage. The wing is as in winter plumage. The autumn moult usually commences about the middle of October, when the *bill*

still retains the yellowish-brown colour of the eclipse (black in winter). In early November the *head* begins to show some of the green feathering of winter plumage; some white feathers appear on *scapulars* and *chest*, and some chestnut feathers on *sides*, *breast*, and *belly*. Further progress towards full winter plumage is slow, and varies greatly in different birds; some birds regain full winter dress in December but the majority not until January.

ADULT FEMALE: *Head* and *neck*, greyish buff, streaked and spotted with dusky brown; *crown* and streak through eye, darkest; *throat*, and area at base of bill, palest and least streaked; *bill* variable, olive grey or olive brown, shading to greenish at tip, finely spotted with black, edges and lower mandible orange, same shape as in male; *eye*, yellow to straw colour. *Body*. *Back*, *scapulars* and *rump*, brown, feathers broadly edged with ashy buff; *chest*, greyish buff, spotted with brownish ashy; *sides*, brownish ashy, feathers broadly bordered with greyish buff; *breast*, *belly*, and *flanks*, greyish buff, less spotted than chest and often stained with rusty; *feet*, orange. *Tail* and *upper coverts*, grey brown, becoming whiter; *under coverts*, greyish buff. *Wings*. *Lesser* and *middle coverts*, greyish blue; *greater coverts*, dusky, more narrowly tipped with white than in male; *primaries*, dusky; *secondaries*, with *speculum* of less metallic green than in male and narrowly bordered in front and behind with white; outer *secondaries*, dusky brown; *tertials*, brownish, with olive wash and margined with ashy buff; *lining*, whitish; *axillars*, white.

JUVENILE. During first autumn and until January sexes are alike and resemble adult female except *upperparts* are darker and more uniform; *head* and *neck* are darker; *underparts* of young male are richer; young males are somewhat brighter than young females and their *breasts* are usually tinged with chestnut. Young males may be told from young females by the *flanks*, which in the former are buff, barred with brown, while in the latter they are as in the adult female. *Bills* of both sexes are pinkish horn. From the end of January young males undergo a steady change towards maturity and month by month they more closely resemble the adult male, but even by June, when the eclipse moult takes place, they are far from fully adult plumage. By second autumn, young males are like adults but duller, and not until second spring is the fully adult plumage achieved. *Wing of Male*. As in adult male but *tertials*, dull, olive brown, and rounded, not pointed as in adult (similar to those of the adult female); *lesser* and *middle coverts*, duller and greyer, with little blue; *greater coverts* with narrow white tips, and generally with dusky spot on white of inner webs. *Wing of Female*. As in adult female but green of *speculum* less extensive, *speculum* being mostly olive brown or dusky; *greater coverts*, with much less white and often barred and spotted with dusky, these coverts often grey blue, with narrow white tips and buffy markings next to shaft; *lesser* and *middle coverts*, with little blue, duller and greyer, and often with central buffy markings, these coverts, sometimes brownish.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A small, strikingly-marked duck, with dark green head, white chest, and red breast and sides. Chief distinguishing features (a) hind toe without lobe, (b) very long, broad, spoon-shaped bill, much longer than head (fig. 43) (c) blue wing-coverts.

The disproportionately large bill of the Shoveller separates it from any other duck.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A small duck, mottled with brown and buff, with pale buffy breast and a large bill. Chief features (a) hind toe without lobe, (b) bill, same as that of male, (c) blue wing-coverts.

The bill readily identifies the female Shoveller.

FIELD MARKS

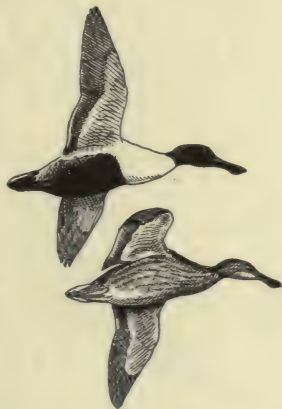
ON THE WATER. The Shoveller has many distinctive field marks. The male sits low on the water with bill pointing in a downward slope; shows more white than any other Pond duck and presents a characteristic appearance, with its large, spoon-shaped bill, sloping forehead, dark head and neck, and chestnut sides. The female is plain brownish buffy, but has the same flat rakish head and large bill as the male; even at some distance, this will distinguish it from other mottled-brown ducks.

IN FLIGHT. They fly in small flocks and, when startled, the flight somewhat resembles that of the teals, being erratic with frequent downward plunges; ordinarily the flight is rather slow, steady and direct. They rise from the water with a clean upward bound and when rising or settling there is a loud rattling of the wings; they alight almost vertically with hardly a splash. Flocks are easily recognized in flight by the distinctive markings of the males, which show from below as alternating black and white, viz, dark head, white chest, dark breast, white belt, dark under tail-coverts. Both sexes show broad chalky-blue wing-patches similar to those of the Blue-winged Teals. The thick head, short neck and huge bill of both sexes are easily noted in flight. The head and neck are carried in a downward slope and the wings appear to be set far back on the body. When on the wing, Shovellers of both sexes are sometimes mistaken for Mallards.

VOICE. Usually a silent bird; it has a small throat and a correspondingly weak voice. The male utters a low, guttural *woh-woh-woh* and a *took-took-took*. Courtship call of male, a low guttural *konk*, *konk*, and a low, rattling *chu-uck, chu-uck*; female, feeble quack.

LIFE STORY

Our little Shoveller, or Spoonbill as it is more popularly called, is a well-known and widely distributed duck, being common throughout North America, Europe and Asia, and being known as a visitor to South America, Africa, and even Australia. There are three other species of Shovellers with similar huge bills; one is found in South America, another in South Africa, and of the third species, there is one variety in Australia and another in New Zealand. The genus *Spatula*, therefore, inhabits every quarter of the globe. On this continent the Shoveller has



a wide range but is more abundant in the central and western portions than in the east. It is essentially a fresh water duck of the sloughs, marshes, streams, muddy ponds, and sluggish creeks. The prairie regions of the middle west afford the type of range which it prefers and to which it is best suited.

Except for its huge bill, the Shoveller is markedly like the Blue-winged and Cinnamon Teals in structure, coloration and habits. The flight of all three is erratic, and all are warm-weather birds, being early migrants in autumn and late in spring. In all the species of Shovellers as well as in these two teals the wing-coverts are blue and the wing markings similar. The South American Shoveller is coloured as is the Cinnamon Teal, and the heads of the Australian and New Zealand varieties are identical with that of the Blue-winged Teal, even to having the same white crescent between the bill and the eye.

The drake is a strikingly handsome and beautiful bird, though its disproportionately large bill gives it a somewhat top-heavy and ungraceful appearance. No other duck possesses a bill like that of the Shoveller (fig. 43). The bills of all ducks have comb-like "teeth" or lamellae along the edges of the upper and lower mandibles; in the case of the Shoveller, however, the bill is highly specialized and these teeth reach their greatest degree of development. In addition, the roof of the mouth and the tongue are supplied with sensitive nerves of touch and taste. The bill is exceptionally large, the average length being about two and

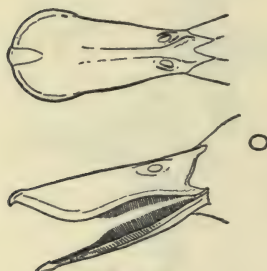


FIG. 43.

Bill of Shoveller

three-quarter inches and it widens from about five-eighths inch at the base to about one and one-quarter inches near the tip. This specially designed bill places the Shoveller at the head of the class of surface feeders. It is in fact more essentially a surface feeder than any of the others, paddling quickly along with its head half submerged, taking into its mouth the tiny particles it encounters, tasting them with its sensitive tongue, and sifting out through the lamellae of its bill such as may not be wanted. This is its usual method of feeding, though it often slushes mud from the bottom through its bill, retaining the edible and rejecting the worthless remainder. The broad bill, the multiplication of the bristle-like, straining lamellae, and the elongation of the intestine of this species are specializations for the nutritive utilization of minute organisms, such as may be found in bottom ooze. While the Shoveller takes more of this bottom food than any other duck, a relatively small percentage of its diet is actually obtained from this source. Shovellers are less given to this method of bottom feeding than is popularly supposed or than is implied by their local names of "mud duck," "mud lark," and "mud shoveller."

Of the surface-feeding methods of the Shoveller, Forbush (1929) says: "Three or four Shovellers will form in line following one after

the other and then the leader will swing round in an ellipse, turning and following the hindmost, each one apparently straining through its bill the water stirred by the paddling feet of the one before it. Thus round and round they go with chattering bills, each one apparently enjoying the guttering exercise and getting some sustenance from the disturbed and turgid element."

The animal food of the Shoveller amounts to about one-third of its total diet. This is a higher percentage than is consumed by any of the other surface feeders, except the Florida and Mottled Ducks, whose animal food amounts to about 41 per cent. An examination of the stomach contents of 70 Shovellers taken from August to April, inclusive, the largest numbers being taken in November and February, gave the following approximate percentages: chiefly the seeds: of sedges, 16; of pond weeds, 11; of grasses, 8; algae, 7; of water lilies, 3; of duck-weeds, 2; of smartweeds, 1; indeterminate material, an appreciable part of which is macerated plant debris which forms an important item of bottom ooze, 18; total vegetable food, 66 per cent. Molluscs, 19; water bugs, 4; water beetles, caddis and dragon fly larvae and nymphs, and other insects, 4; fishes, 3; crustaceans and miscellaneous, 4; total animal food, 34 per cent.

The courtship of the Shoveller is performed both in the air and on the water. Spirited aerial flights are undertaken in which one female is pursued by two or three drakes; they circle and twist in their erratic flight very much after the manner of the teals. On the water the performance is not very demonstrative; the male swims slowly up to the female uttering his love notes of *chu-uck chu-uck*, varied, but not improved, by an occasional *konk, konk*, at the same time elevating his head and jerking his bill upwards. The female responds quickly with bows of recognition and they both proceed to swim slowly around in circles, one behind the other, with water running through their bills.

The female Shoveller, and one would never think it of her, indulges in the luxury of two husbands. Polyandry is very prevalent with this species and the amiability with which this unusual matrimonial arrangement is accepted



by both husbands is astounding or, depending on the point of view, commendable. Polyandry is also practised to some extent by the Mallards, but the males of that species apparently have more Christian ideas on the subject and object strongly; jealousy flares between the marital partners, leading to constant domestic brawls and nasty physical encounters. Perhaps the Shoveller's view of the matter is the wiser, for after all, life is short, especially that of a much hunted waterfowl. So why quarrel? Dismissing the moral aspect and returning to the facts of the case, it is interesting to note that it is not until after two adult Shovellers have paired that the second husband comes along. He is usually a young drake of the previous year with incomplete plumage, who has probably found that the young females of his own generation have gone off by themselves and do not intend to pair until next season, as is generally the case with this species.

The nest of the Shoveller is a hollow in the ground sparingly lined with dry grass and weeds and surrounded with a rim of down, the supply of which is increased as incubation proceeds, until a blanket has been formed with which to cover the eggs when the duck leaves her nest. The location is variable and the nest may be a long way from water, though preference seems to be given to a site in the rank grass around the boggy edges of sloughs and ponds. The usual clutch is from 10 to 12 eggs, though the numbers range from 6 to 14; they are very pale olive buff or very pale greenish grey in colour and average 2.05 by 1.46 inches. Incubation continues for 21 to 23 days and is performed by the female alone upon whom the responsibility of raising the family also devolves. As soon as incubation is well started the males gather in flocks by themselves in the nearby sloughs and ponds and shake from their shoulders (scapulars!) all family cares. When first hatched, young Shovelers have bills no larger than those of other Surface-feeding Ducks but the bills seems to grow considerably faster than the little birds them-

selves, so that by the time the ducklings are about ten days old there is no mistaking them for the young of any other species.

The Shoveller springs vertically from water or land with a strong upward bound and a loud rattling of the wings, and darts off with a swift, erratic flight, punctuated with sudden downward plunges. The flight is much like that of the teals and, like them, the Shoveller decoys readily and has the habit of circling and returning to the decoys even after being shot at. This strong, sturdy little flier is one of the few ducks that brave the long 2,000 mile flight from Alaska to the Hawaiian Islands. As a game bird it does not rank very high; the majority of specimens are thin and scrawny and the flesh is of poor quality. Occasionally, however, due no doubt to special



feeding, they are fat and juicy and as palatable as any of the teals.

Shovellers love the warm weather and in the autumn the first early frosts bring back recollections of their sunny winter homes; south they start by mid-September and before the end of October the migration is over. On their autumn migration they are often found in association with Blue-winged teals. In the spring they wait until the sloughs and ponds are free from ice, and, though they start to move from the most southern portions of their winter quarters before the end of March, it is not until the first week in May that they reach the northern limits of their breeding range in Alaska. In the spring they migrate in small flocks by themselves and soon after arrival on their breeding grounds break up into pairs or three's consisting of one female and her two husbands. Their main winter range is in the Southern States and Mexico, where they inhabit the shallow inland waters, rarely visiting the coasts.

Wood Duck

Aix sponsa

(aks, spon-sa)

Colour Plates Nos. 15 and 14. Downy Young No. 33.

SCIENTIFIC NAME

Aix, Greek, a kind of water-fowl in Aristotle; *sponsa*, Latin, meaning betrothed, i.e., as if in wedding dress, referring to the beautiful plumage.

COLLOQUIAL NAMES

IN GENERAL USE: Summer duck; wood duck (sometimes shortened to woody).
IN LOCAL USE: Acorn duck; black; branchier (inhabitant of the branches; varied to brancheur and branchu); the bride; canard du bois (wood duck); canard d'été (summer duck); grey duck; plumer; squealer; swamp duck; tree duck; widgeon; wood wigeon.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head*. *Crown*, metallic green; *crest*, iridescent green and bronze in front, darkening to iridescent bronzy, blue and purplish black at rear; *side of head*, with areas of iridescent purple violet, green and bronze; *hindneck*, velvety black; *chin* and *throat*, white; *foreneck*, white, from which two broad white bars extend upwards, one ending below and behind eye and the other terminating in black of hindneck; a narrow white streak extending from base of bill over eye, into crest at nape; another horizontal white streak from behind eye, into crest at nape; *bill*, upper mandible, pinkish white in middle, lake red at base, with narrow yellow border, with ridge, tip, *nail* and lower mandible, black (colours, especially red, fading after breeding season); bill, much shorter than head, narrow, height at base greater than width; nail very broad and sharply hooked; *eye*, bright orange red to vermillion, *eyelid*, vermillion (orange yellow in autumn). *Body*. *Back* and *rump*, rich bronzy green; *scapulars*, black, glossed with purplish green; *chest*,

glossy purplish chestnut, paler and spotted with white where it meets white *breast*; vertical bar of white and one of black on side of chest in front of folded wing; *sides*, pale buffy, minutely vermiculated with black; the longer side-feathers broadly black-and-white; large patch of purplish chestnut on each flank near base of tail, the long upper flank-feathers here are blackish with central orange-brown streak; *belly*, white; *feet*, dull yellow to orange yellow, with blackish *webs*; *claws* narrow, sharp, and curved. *Tail*, black, glossed with purple, green, bronze and blue; *under surface*, glossy brown; *upper coverts*, black, glossed with purple and green; *under coverts*, glossy dark brown. *Wings*. *Lesser coverts*, greyish brown, with olive reflections; *middle* and *greater coverts*, glossed with metallic green and purple and tipped with black; *primaries*, silvery grey on outer webs, dusky on inner webs, with metallic-blue tips; *secondaries*, with *speculum* of iridescent bluish green, bordered behind with narrow black and white bars, in front with black bar and inwardly by rich dark purple; *tertials*, inner ones black, with white tips, outer ones black, glossed with metallic blue; *lining* and *axillars*, white, marked with dusky brown.

ECLIPSE PLUMAGE: The moult into the eclipse starts in June or July and is at its height in August. The full-plumaged wing is renewed. The eclipse plumage resembles that of the juvenile male, except that the *breast* of the adult remains white and is not mottled as in the case of the juvenile; the *back* retains almost the full metallic lustre of the winter plumage. The white markings of winter plumage on the *neck* and *throat*, show distinctly throughout this moult.

AUTUMN PLUMAGE: The moult out of the eclipse, in which the male closely resembles the juvenile male, commences in August or September, and progress toward full winter plumage is rapid. The wing is as in winter plumage. In the early stages green *crown* and *crest* colours develop; dark feathers begin to show on the *scapulars*, purple feathers on the *upper chest*, and the vermiculated feathers on the *sides* begin to appear. Much variation in sequence occurs, some birds develop the back plumage before that of the head, and vice versa. Later, the grey on the *forehead* and *sides of head* is replaced, and the *crest* takes on its full length; the *back* and *rump* gradually become bronzy green, and the *scapulars*, black; the whitish feathers of the chest are replaced by purple and the white bar before the wing becomes noticeable. Last to appear, usually by early October, are the broad black-and-white markings of the longer *flank-feathers*, and the black bar in front of the wing. Some birds regain the full plumage by the middle of September and others not until the middle of October.

ADULT FEMALE. *Head*, brownish ashy; *crown* and *crest*, brownish, glossed with greenish; *chin* and *throat*, white; *neck*, brownish ashy; white ring around eye tapering to a streak behind eye; narrow white ring around face near base of bill, some times faint or lacking; *bill*, bluish grey, ridge and *nail*, blackish, whitish spot below nostril, edges pinkish; bill, shape same as that of male; *eye*, blackish brown, *eyelids*, bright yellow. *Body*. *Back*, *scapulars* and *rump*, brown, glossed with bronze and greenish purple; *chest* and *sides*, olive brown, mottled with buffy; *breast* and *belly*, white or creamy, the latter mottled with brownish; *feet*, dull yellow with dusky *webs*. *Tail*, olive brown, glossed with greenish; *upper coverts*, brown, sometimes faintly glossed with bronzy green; *under coverts*, white, speckled with greyish brown. *Wings*. Same as those of male except (a) colours duller and less iridescent, (b) small patch of reddish purple on inner *greater coverts*, (c) *secondaries*, much more broadly tipped with white, mostly on outer web, (d) *tertials*, brown with bronzy gloss.

JUVENILE. In first plumage, up to September, sexes are alike and somewhat resemble adult female; *crown* is dark brown but in male has a greenish lustre; sides of the *head* and *forehead*, dull grey, with white ring around eye more conspicuous in young female; stripe over eye and area between bill and eye, dull white; *throat* white in both sexes, but in male, white extends up into cheek and side of neck as in adult male; *eye*, light brown in young male, dark brown in young female; *upper surface* of body, brown, with metallic lustre of purple, green and bronze; *breast* and *belly*, whitish, mottled with dull brown; *chest* and *sides*, whitish, tinged with bright brown or buff. During September and October, mottled *breast* of young male becomes white, *chest* becomes rich chestnut and *sides* become vermiculated. During October, adult *head-pattern* and much of the brilliant iridescence of *back* and *scapulars* is acquired. By November, young of both sexes are practically adult. Full perfection of adult plumage during second spring. *Wing of Male*. Essentially as in adult male but somewhat duller; *lesser* and *middle coverts*, with less blue *tertials*, shorter, narrower, and dull brown. *Wing of female*. As in adult female.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A small, gorgeously-coloured, strikingly-marked duck. Chief distinguishing features (a) hind toe without lobe, (b) unique combination of iridescent colours of crested head, body, and wings, (c) dull-yellow feet.

In hand it is difficult to confuse the male with any other duck. (The Gadwall and the tiny Blue-winged and Cinnamon Teals are the only other River and Pond ducks with yellow feet.)

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A small, drab, greyish-brown duck, with a white breast. Chief features (a) hind toe without lobe, (b) elongated crest, (c) dull-yellow feet, (d) bright-hued wing.

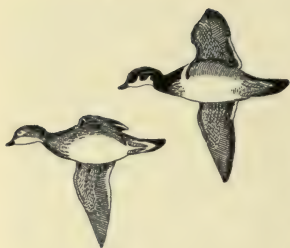
The female Gadwall, which is another brown-backed, white-breasted duck of this subfamily, also has yellow feet, but its white speculum will prevent confusion. The crest and bright wings of the female Wood Duck will distinguish it from the female Baldpate and European Widgeon, and from the tiny brown-backed, female Teals.

FIELD MARKS

ON THE WATER. The conspicuous and distinctive markings of the male render enumeration of field marks almost unnecessary; the white-striped, crested head, white throat, dark chest, and body are readily recognized. The drake sits "proudly" on the water; he floats high and buoyantly, with tail well elevated, and looks very much on the alert. The red-and-white colour of the bill is noticeable at a surprising distance. The white eye-ring, white throat and thin crest will identify the more drab female; the female displays more colour than does the female of most other species.



IN FLIGHT. The flight is swift and direct. The carriage of the head of both sexes is distinctive; the head is held high, above the level of the body, with

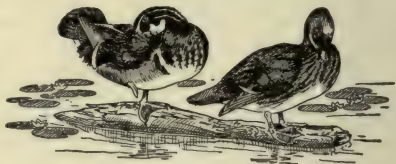


the bill pointing downward at a noticeable angle. The black and white bars in front of the wings of the male are good field marks. The combination of dark chest and wings, long dark tail and white breast will identify the male Wood Duck. Both sexes show a high proportion of white on the under surface and for this reason, and on account of similar size, resemble Baldpates in flight, though the downturned bill, not pointed forward like that of the Baldpate, should distinguish the species even at a distance.

VOICE. A very chatty bird, especially when feeding in the woods, when it squeals, clucks, and squeaks loquaciously. The male emits a long series of whistles—*hoo-w-ett*, *hoo-w-ett*, repeated, and a *chick-a-waugh*, and a *cheep-cheep*, and a mellow *peet-peet*, and when startled, a *hoo-eek*, *hoo-eek*, and a series of little *chick*, *chick's*, low, and hardly audible at a distance of 30 feet; the female, when startled, a sharp *cr-r-ek*, *cr-r-ek*, *cr-r-ek*. The call of the mother to the young is a soft and prolonged *pe-ee*, *pe-ee*, to which they respond with a mellow *pee*, *pee*, *pee*, often and rapidly repeated.

LIFE STORY

Indisputably the drake Wood Duck is the most beautiful of all our wildfowl. And it is entirely our own. Peculiar to North America, it breeds across the continent and winters mainly in the Southern States. Adjectives such as "beautiful" or "gorgeous" fail to do justice to its resplendent, iridescent plumage, with its combination of delicately graduated vermiculations, offset by bold dashes of white against the rich dark background. Not only the male, but the female, too, shows more colour than the females of other species. And the setting chosen for all this beauty serves but to enhance it; for this Beau Brummel frequents secluded inland pools and streams bordered by woods and forest swamps. Here it perches on the limbs of the trees, preens its feathers on the fallen mossy logs and flies through the branches and tree tops, threading its way with the greatest of ease.



The Wood Duck has always been persecuted by man; not alone for its flesh, which is good, but for its feathers which is used in the making of artificial trout flies, and for collections which, when carefully mounted by the taxidermist, it adorns. The woods which shelter it have been cut, and the ponds and swamps in which it feeds have been drained and reclaimed. As a result this lovely species, formerly so abundant, was brought to the point of extinction. Timely legislation, however, saved it and the Wood Duck, through the protection afforded by law, is once more becoming common throughout the land. In 1918, a closed season was declared in Canada and the United States, and protection was

continued until 1941, when, in several of the states in the United States, it was permitted to include a single Wood Duck in a bag-limit; the species is still protected in Canada. It is a delicious table bird, and has always been popular with gunners. Living as it does, throughout its range, close to human habitation, it has been an easy mark for every type of shooter, from the farm lad up. Normally it is a trusting species and decoys readily, but if its suspicions are once aroused it will avoid the decoys with great cleverness.

The makers of artificial flies, used by anglers, would pay from \$3.00 to \$4.00 for a prime, full-plumaged skin of a male Wood Duck. Certain feathers from the breast and sides went into the manufacture of Light and Dark Cahill flies and Quill Gordon flies, all of the "dry fly" variety; feathers from the wing were used in Salmon flies. During the period that the Wood Duck was protected, feathers of the domesticated Mandarin Duck were used instead, and, also, feathers from the Mallard, suitably dyed for the purpose.

In Audubon's (1840) own words the courtship of the Wood Duck is described as follows: "Here they are, a whole flock of beautiful birds, the males chasing their rivals, the females coquetting with their chosen beaux. Observe that fine drake! How gracefully he raises his head and curves his neck! As he bows before the object of his love, he raises for a moment his silken crest. His throat is swelled, and from it there issues a guttural sound, which to his beloved is as sweet as the song of the Wood Thrust to its gentle mate. The female, as if not unwilling to manifest the desire to please which she really feels, swims close by his side, now and then caresses him by touching his feathers with her bill, and shows displeasure towards any other of her sex that may come near. Soon the happy pair separate from the rest, repeat every now and then their caresses, and at length, having sealed the conjugal compact, fly off to the woods to search for a large Woodpecker's hole. Occasionally the males fight with each other, but their combats are not of long duration, nor is the field ever stained with blood, the loss of a few feathers or a sharp tug of the head being generally enough to decide the contest. Although the Wood Ducks always form their nests in the hollows of a tree, their caresses are performed exclusively on the water, to which they resort for the purpose, even when their loves have been first proved far above the ground on the branch of some tall sycamore."

The Wood Duck is the only member of the subfamily of River and Pond Ducks that habitually nests in trees; it never nests upon the ground but, occasionally, failing a suitable tree site, will nest in a barn or some such disused building. It does not nest in the branches or fork of a tree but always in natural cavities in the trunk or large branch. It prefers hollow trees in close proximity to water, but if such are not available, will make its home further away. It takes readily to nesting boxes erected in suitable locations. The hole chosen may be close to the ground or as high as 50 or 60 feet above. No outside material is transported to the nest by the bird but it makes use of any chips or other material that

may already be there, with which it mixes down from the breast. The Hooded Merganser has similar nesting habits and habitat, and frequently the possession of a nesting site is hotly contested with the odds in favour of the Wood Duck. As many as 31 eggs have been found in a nest; this large number being probably the product of more than one female as the usual clutch is from 10 to 15. The colour is dull white or creamy white and the average size is 1.98 by 1.56 inches. Incubation takes from 28 to 31 days and is performed by the female alone for, as is usual among ducks, the male deserts the female after incubation is well started.

Of the nesting habits of this species Hawkins and Bellrose in their unpublished studies of this species, say: "The suitability of a cavity probably is determined primarily by its dimensions and availability to the ducks. A female Wood Duck weighs about $11\frac{1}{4}$ lbs., is about 18 inches long and can pass through a hole 4 inches in diameter. She is remarkably adept at getting in and out of tight places, but undoubtedly prefers more spacious nesting cavities when they can be found Commonly the female leads in the search for the nest; the male follows. Alighting on some horizontal limb of a tree, the pair usually spends considerable time craning their necks until they spy a cavity. This the female investigates. Sometimes the entrance is too small, and despite her vigorous efforts she cannot enter. At other times she manages to enter but is forced to back out. Meanwhile the male waits on his perch. . . . The male usually accompanies his mate on the early visits to a nest, sometimes waiting an hour or more for the female to reappear from inside the cavity. Perhaps during these early visits the female is engaged in hollowing out and packing down the cup-shaped depression in which the eggs are later laid."

The same writers describe a ruse which is commonly practiced by the Wood Duck to prevent discovery of its nesting site. "Unusually spectacular was the twice-daily return to the nest of one pair. Their nest was in the hollow of a sycamore near one corner of the village square of Bath, a town of 300 people. . . . The ducks . . . dropped on set wings toward the sycamore. The female was ahead, the male a few feet behind. Flying within 4 feet of the ground, the hen rose swiftly to the entrance, pausing a split second before entering. The male hovered momentarily in flight; then recovering momentum he darted under the telephone wires, up over the village and away to the river. Had we not been on the lookout for some such maneuver, our attention would have been distracted from the bird entering the nest. One might well speculate on how this excellent deception, which is a trait of the species, was evolved."

How do the downy young, unable as they are to fly, get from a nest situated 50 feet above the ground? Apparently the usual method is for the little fellows to jump out and flutter down as best they can; their light, resilient little bodies, with tiny wings and feet spread out to check the fall, come to no harm. They first use their sharp little claws to climb from the nest which may be six or eight feet below the opening, and at the call of the mother duck below simply jump for it. Forbush (1929) says:

"Young Wood Ducks when hatched are well equipped for climbing as they are provided with exceedingly sharp, pin-pointed, hooked claws and with hooked nails at the ends of their bills; so expert are they that in many cases when confined in a box or keg, they have been known to climb out, going up the perpendicular sides like flies walking on a wall."

The manner in which young Wood Ducks reach the ground from their high nests is related in an unpublished MS. by Hawkins and Bellrose as follows: "There has been considerable discussion of the manner in which young Wood Ducks leave the nest. Phillips, who has investigated this subject more thoroughly than anyone else, could find no convincing evidence that adult Wood Ducks ever carry their young from the nest to the ground or water. On May 31, 1938, we observed young leave a nesting box located 21 feet above the ground and 50 feet from the shore of Lake Chataqua. At 8.58 a.m. the female appeared at the entrance and, evidently reassured that no danger was near, dropped to the ground and commenced to call. Her note was soft, subdued, and scarcely audible 20 feet away. At once a chorus of peeping cries broke out from within the nesting box. Seconds later, a duckling appeared at the entrance, peeped loudly, and, with an upward and outward spring, jumped. In similar fashion 10 other ducklings followed in quick succession. Five minutes after the first had jumped, all were following their mother to the lake. Since that time, we have obtained four additional records of the young leaving the nest by jumping. We do not believe that the fall from the nest is a serious cause of mortality in ducklings. The entrance to another nesting box was about 22 feet above a concrete sidewalk. Witnesses to the exodus of a brood of Wood Ducks hatched in this box in 1939 saw the ducklings bounce as they landed on the sidewalk, but apparently no injuries resulted. If a 6-foot man fell a distance as many times his height, his fall would be over 500 feet." See also the "Life Story" of the American Golden-eye.

Although the Wood Duck is often seen on open stretches of water or marshy land, its usual feeding grounds are along the banks of woodland streams and ponds. Here it feeds upon the seeds of various trees and shrubs and wanders deep into the woods in search of nuts, grapes and berries. It is particularly partial to chestnuts, beechnuts, and acorns of the burr and pin oak, which it swallows whole, turning over the leaves to find them, and of which it will often make an entire meal. The tremendous crushing and grinding power of the gizzards of ducks breaks the shells of the hardest nuts to pieces, as they enter that organ, after which, chemical disintegration completes the process. Mabbot (1920) says: "The powerful crushing and grinding ability of the Wood Duck's gizzard is shown by the presence in 76 of the stomachs examined of fragments of the nuts of the bitter pecan (*Hickoria aquatica*). These nuts have as hard a shell as any of the northern hickory nuts, yet they are broken as they enter the gizzard and before they can possibly have been exposed to the full crushing power of that organ." See also the "Life Story" of the Mallard.

The stomach contents of 399 of these birds from 24 States and from Ontario, taken during the months of August to December and during February to April, inclusive, showed the diet to be about nine-tenths vegetable matter and gave the following approximate percentage: duckweed, 10; cypress cones and galls, 9; sedges and tubers, 9; grasses and grass seed, 8; pondweeds, 7; acorns and beechnuts, 6; seeds of water lilies and leaves of water shield, 6; seeds of water elm and allies, 5; of smartweeds and docks, 5; of coontail, 3; of arrow arum and skunk cabbage, 2; of burr marigold, 2; of buttonbush, 2; of burr reed, 2; wild celery, 1; pecan nuts, 1; grape seeds, 1; seeds of swamp privet and ash, 1; miscellaneous plant food, 10; total vegetable food, 90 per cent. Dragon flies, 3; bugs, 2; beetles, 1; grasshoppers, crickets, flies, wasps, spiders and miscellaneous, 4; total animal food, 10 per cent. Contrary to the habits of most ducks, molluscs, snails, and bivalves are seldom taken. They are

very fond of spiders and in some of the stomachs examined, spiders represented as much as 75 or 80 per cent of the contents.

The Wood Duck roosts during the night in open pools in the woods, and in the early dawn flies out to its feeding grounds in the wild rice marshes and the banks and shores of sluggish streams and ponds. It will rise and fly over the tops of the highest forest trees on its way to and from its roosting and feeding grounds. Of its behaviour, Bent (1923) says: "No duck is so expert as the Wood Duck in threading its way through the interlacing branches of the forest, at which its skill has been compared with that of the passenger pigeon. I have stood



on the shore of a woodland pond in the darkening twilight of a summer evening and watched these ducks come in to roost; on swift and silent wings they would glide like meteors through the tree tops, twisting, turning, and dodging, until it was almost too dark for me to see them. Ordinarily its flight is swift and direct, usually high in the air. When migrating it flies in small flocks, probably family parties." Audubon (1840) says: "On the ground the Wood Duck runs nimbly and with more grace than most other birds of its tribe. On reaching the shore

of a pond or stream, it immediately shakes its tail sidewise, looks around, and proceeds in search of food. It moves on the larger branches of trees with the same apparent ease; and, while looking at thirty or forty of these birds perched on a single sycamore on the bank of a secluded bayou, I have conceived the sight as pleasing as any that I have ever enjoyed. . . . They swim and dive well, when wounded and closely pursued, often stopping at the edge of the water with nothing above it but the bill, but at other times running to a considerable distance into the woods, or hiding in a cane-brake beside a log."

The northern limits of its summer range extend no further north than Southern Canada so it has not far to travel on its migration. In the autumn it is an early migrant, moving south in September and the early part of October. In the spring it is moderately early and appears in its summer haunts just as soon as the ice has left the pools and timbered swamps. As it both breeds and winters over such a large portion of its range, its migrations have been hard to trace. Its winter home extends as far south as central Mexico but the large majority stay in the inland ponds of the Southern States, rarely, if ever, visiting the sea coasts.

BAY, SEA OR DIVING DUCKSSubfamily *Nyrocinæ***Redhead***Nyroca americana*

(ni-ro-ka, a-mer-i-kán-a)

Colour Plates Nos. 16 and 17. Downy Young No. 34.

SCIENTIFIC NAME

Nyroca, Latinized form of the Russian word Nirok or Nyrok, meaning a diving duck, originated by Fleming in 1822; *americana*, Latinized form, meaning of America.

COLLOQUIAL NAMES

IN LOCAL USE: Canard mulet (mule duck); canard tete rouge (red-headed duck); canard violon (fiddle duck); fiddler duck; red-headed broadbill; red-headed raft-duck; redneck; violon (violin, fiddle).

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* (fig. 45) and *upper neck*, rich reddish chestnut, with purplish iridescence; *lower neck*, blackish; *head*, high-domed and puffy; *bill*, pale bluish, with whitish ring bordering the black tip, shorter than head, about one-half as wide as it is long; *eye*, orange yellow to lemon yellow. *Body. Chest and foreback*, blackish; lower chest, with some feathers edged with ashy; *back, scapulars and sides*, finely vermiculated with dusky-and-white, producing dark grey effect; *rump*, blackish; *breast*, white; *belly*, whitish, finely marked with dusky. (General effect of body, darker than that of body of Canvas-back). *Feet*, bluish grey, with dusky webs. *Tail*, blackish, paler terminally; upper and under *coverts*, brownish black. *Wings. All coverts*, grey, slightly flecked with whitish; *primaries*, brownish grey, darker near tips and on outer webs; *secondaries*, with pearl-grey *speculum*, slightly darker near white rear border; outer webs of *inner secondaries* edged with black; *tertials*, grey; *lining*, whitish and grey; *axillars*, pure white.

ECLIPSE PLUMAGE: The eclipse is partial only. The moult starts in late June; the full-plumage wing is replaced in the latter part of that month. In this plumage *head* and *neck* become browner breast mottled, and brown feathers appear on *back* and *rump*.

AUTUMN PLUMAGE: From the partial eclipse plumage, described above, adult males in early autumn commence to moult into the winter plumage. The wing is as in winter plumage. The full reddish colour of *head* and *upper neck* is regained fairly quickly, and on *lower neck, chest*, and *upper back*, black feathers begin to outnumber brown ones of the eclipse; new, vermiculated winter-feathers may be seen coming in on *back, scapulars*, and *sides*. By November, in most cases, full winter plumage has been attained. In more backward individuals some brownish feathers remain on *back* and *scapulars*; whitish tips persist on *chest-feathers*, and some buffy-brown eclipse feathers remain on *flanks*.

ADULT FEMALE. *Head* and *neck*, yellowish brown, darker on *crown*; area at base of bill, paler; *chin*, whitish; faint palish streak behind eye, and pale ring

around eye; old females usually have some scattered grey feathers on head; *bill*, same as male, but duller; *eye*, brown. *Body*. Entire *back*, *scapulars*, and *rump*, dark greyish brown, sometimes finely speckled with whitish, feathers of scapulars tipped with ashy; *chest*, brownish, feathers tipped with ashy; *sides*, brownish, feathers tipped with buffy; *breast*, whitish, shading into greyish brown on *belly*; *feet*, duller than those of male. *Tail*, greyish brown, sometimes whitish terminally; *coverts*, greyish brown, *upper* ones narrowly tipped with buffy, longer *under coverts*, whitish. *Wings*. All *coverts*, brownish grey; *primaries*, brownish grey, darker near tips and on outer webs; *secondaries*, with *speculum* of pearl grey, slightly darker near white tips, inner secondaries, edged with black on outer web; *tertials*, brownish grey; *lining*, whitish and grey; *axillars*, white.

JUVENILE. In first plumage sexes are alike and somewhat resemble adult female, except that they are more mottled and have less clear brown *above*, and are dull grey brown, mottled with white, *below*. Young males are darker than young females, particularly on *breast* and *head*. During November the black feathers on *breast* of young male appear, but are tipped with brown at first. In December, the red feathers of *head* and *neck* begin to appear, and the grey, vermiculated feathers of *back*, *scapulars* and *sides* are assumed. By February at latest the plumage is practically adult. Progress of young females to maturity is practically the same. *Wing of Both Sexes*. As in adult female but *coverts* of young male show more grey markings (though less than in adult male), and *speculum* is almost solidly grey. *Coverts* of young female are browner than in adult female, and the grey markings are generally entirely lacking or are much less distinct.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A large, grey-backed, white-breasted duck, with red head and black foreparts. Chief distinguishing features (a) hind toe with lobe, (b) high-domed head, with abrupt forehead (fig. 45), (c) bright reddish-chestnut head and upper neck, (d) bill short, about half as wide as long.

Most closely resembles male Canvasback, but has darker back, red of neck ends higher and head is different shape.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A large, brown-backed, white-breasted duck. Chief features (a) hind toe with lobe, (b) yellowish-brown head, with whitish chin, (c) abrupt forehead, (d) short, broad bill, (e) pearl-grey speculum.

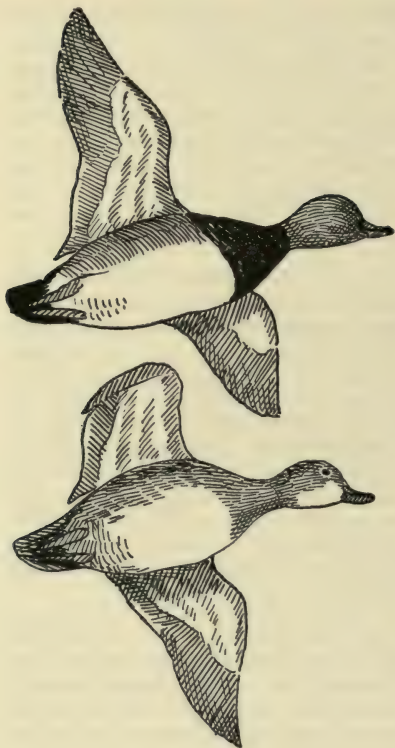
Most closely resembles female Ring-necked Duck but lacks white eye-ring of that species and the two white rings on bill. Bears general resemblance to females of Scaup and Canvas-back, both being brown-backed and white-breasted.

FIELD MARKS

ON THE WATER. Large ducks, the male with a puffy, round, dark head, black neck and chest and greyish body; the female with all-brown upper parts and the same shaped head. They are quite similar superficially to the Canvas-backs but the body colour of the respective sexes is darker, and the outline of the



head will readily separate the species. The females closely resemble females of Scaup and Ring-neck but are considerably larger; if close, the white face-patch of the female Scaup, and the white eye-ring of the female Ring-neck will distinguish.



IN FLIGHT. These ducks migrate in V-shaped flocks but on their feeding grounds they move in large flocks in irregular formation. On the wing they appear shorter and darker than Canvas-backs, the wings beat even more rapidly, and the flight is more erratic. They rise from the water in confused manner and the flight always appears hurried. When "rafting," the flock will suddenly "boil up" and as quickly, resettle, without apparent reason. Morning and evening promenade flights, to and fro, for long distances are undertaken. The recognition marks in flight are the same as when on the water except that the white breasts of both sexes are in evidence.

VOICE. The male makes a mewing sound like the mew of a large cat—a deep-toned *me-ow*, also a guttural purring or rolling sound; in spring, but rarely in autumn, the male utters a *qua-qua*. The female, when rising from the water makes a loud, clear *squak*, higher in tone than the voice of the female Mallard, and distinctive in quality; also a growling sound, *r-r-r-r-wha, r-r-r-r-wha*. The courtship voice of the male is a drawn-out groaning call, *whee ough*, in a high tone; that of the female is *quek, que-cek*.

LIFE STORY

The Redhead, or American Pochard, is one of our finest and most important game birds. In the Diving Duck group it ranks second only to the Canvas-back, and that mainly because it is slightly smaller. It differs from the Common Pochard of the Old World in being somewhat larger and more intensely coloured, and in lacking the black base of the bill which is conspicuous in the European species.

In North America the Redhead is a widely distributed and well known duck and in its migrations is found from coast to coast, frequently in association with the Canvas-back. It is decidedly a more southern breeder than the Canvas-back; its main breeding range lies in central Canada and the northern Central States. In its distribution the Redhead is often most erratic; it will be abundant for a long time in certain areas, then completely absent from these haunts for an equal period, only to return later in great abundance. Perhaps no species has decreased more alarmingly in the last twenty years, probably due to the fact that its breeding area is well within the bounds of civilization, and progressive reclamation projects, settlement, and agricultural operations

affect it directly. The serious droughts of recent years have taken excessive toll of this and other slough-nesting species.

In courtship, the females are the ones which appear to take the initiative, but after marriage the males assert their rightful superiority and enforce it by stern disciplinary measures when necessary. Wetmore (1920) relates having witnessed the display of these ducks on several occasions and describes an instance as follows: "A party of four males and three females were swimming in open water, two of the birds apparently being mated. Suddenly one of the females began to display, approaching one of the males with her head held high, sometimes jerking it up and down and again holding it erect, and at intervals calling *quek*, *que-e-ek*, the last a peculiar rattling note. The male chosen extended his neck, holding his head erect, frequently whirling quickly to show the female his back, or again sank down with his head drawn in while the female bowed before him. At short intervals she opened her mouth and bit at him gently or, if he was swimming, sprang quickly in front of him with her head erect and back partly submerged. She transferred her attention from one male to another in turn, even approaching the one who apparently was mated. The males showed considerable jealousy over these favors and drove each other about in fierce rushes. At intervals they called, the note being a curious drawn-out groaning call, resembling the syllables *whew-ough* given in a high tone. As it was given the male sometimes raised his breast, elevated his head, and erected his crest. Again he threw his head straight behind him so that it touched his dorsum above the rump, with the throat and the bill pointing toward the tail. The bill was then thrown up and head brought again to the erect position as the call was made. The curious actions of the male in calling continued after he was mated, and the strange call note was heard often. Mated males were seen driving savagely at their mates and biting at them while they escaped by diving."

The Redhead breeds no further north than the central portions of the Canadian provinces of Alberta, Saskatchewan and Manitoba. Its nest is most often found among the flags, reeds, bulrushes, and cat-tails of the sloughs and swampy areas, comparatively close to deep water, and usually is placed in a clump of such vegetation slightly above the level of the water. It is a handsome structure, well made of reeds, deeply hollowed, and plentifully lined with down, which accumulates as incubation proceeds and is often formed into a blanket with which to cover the eggs. The nest is similar to that of the Canvas-back but the down in it is whiter. The number of eggs varies from 6 to 27 but the larger sets are probably the product of more than one female, as Redheads are very prone to lay their eggs promiscuously in the nests of other species as well as in the nests of others of their own kind. The usual clutch is from 10 to 15 eggs, of a pale olive buff or cream-buff colour, and an average size of 2.41 by 1.71 inches. The shell of the egg is exceptionally hard and tough. Incubation is performed by the female alone and takes from 24 to 28 days.

Nine-tenths of the food of the Redhead is from the vegetable kingdom; this is an appreciably higher percentage of vegetable matter than is consumed by any of the other Diving Ducks. It dives in the deep

water to obtain the leaves and stems of aquatic plants, and it dabbles with the Surface-feeding Ducks in the shallow marshes to feed on molluscs, grasshoppers, and other insects. An examination of the stomach contents of 364 of these ducks, taken in 26 States and 5 Canadian Provinces, during every month in the year except May and August, gave the following approximate percentages: pondweeds, 32; muskgrass, 23; sedges, 8; grasses, 6; wild celery, 3; duckweeds, water lilies, coontail and smartweeds, 5; miscellaneous plant food, 13; total vegetable food, 90 per cent. Insects, 6; molluscs and miscellaneous, 4; total animal food, 10 per cent. The entire meal of more than 70 per cent of the



birds was plant food and it was found that this species feeds less on buds and tubers than does the Canvas-back, and more on the submerged leaves and stems of aquatic plants. Less than one per cent of the birds examined had fed exclusively on animal food. The highest percentage of animal food was consumed during the winter, from December to February inclusive. Fine gravel formed five per cent of the total stomach content.

As a desirable table bird, the Redhead, in the opinion of many, ranks as high as the vaunted Canvas-back, and it is a sensitive palate indeed that can choose between choice birds of the two species. The outstanding difference in the food habits of the two ducks is that the Redhead feeds less heavily on wild celery and very much more heavily on the bulblets, stems, and leaves of muskgrass, and its diet is 90 per cent vegetable, while that of the Canvas-back averages 80 per cent plant food. The Redhead never has the fishy flavour which the Canvas-back often acquires through its somewhat different feeding habits. Were it not for the half pound difference in weight, in favour of the Canvas-back, the reputation of the two ducks, gastronomically, might well have been reversed. As the two species look somewhat alike and many persons cannot distinguish between them, the meat of the Redhead is no doubt fre-

quently enjoyed in the belief that it is the world-famous Canvas-back that is being washed down with that glass of old burgundy.

On its migrations the Redhead travels in V-shaped formations and moves with great speed. Elliot (1898) says: "The flocks rarely alight at first, even when there may be numbers of ducks congregated on the water, but traverse the length of the sound or lake as if reconnoitering the entire expanse and trying to select the best feeding ground. After having passed and repassed over the route a few times, the flock begins to lower, and gradually descending, at length the wings are set and the birds sail gradually up to the chosen spot, usually where other ducks are feeding, and drop in their midst with many splashings. But while this is the usual method adopted by newcomers, sometimes the program is changed, and the birds, attracted by a large concourse of their relatives, particularly if the day be calm and the sun shining with considerable heat, will suddenly drop from out the sky with a rapid zigzag course, as if one wing of each duck had been broken, and they cross and recross each other in the rapid descent, their fall accompanied by a loud whirring sound, as the air is forced between the primaries. On such occasions the flock is mixed all up together in a most bewildering manner, until, arriving a few feet above the water, the wings become motionless and the birds glide up to and alight by the side of their desired companions.

"Early in the morning, and again late in the afternoon, the Redhead regularly takes a 'constitutional.' The flocks that have been massed together during the night or the middle of the day, rise from the water, not all together but in companies of several dozen, and stringing themselves out in long, irregular lines, each bird a little behind and to one side of its leader, fly rapidly up and down, at a considerable height over the water. Sometimes these morning and evening promenades are performed at a great elevation, so that the movement of the wings is hardly perceptible."

Another curious habit of the Redhead is that flocks lying out in the deep water will suddenly "boil up," rising into the air for a few feet, and as quickly resettle, without apparent reason of any sort for the commotion. Like most Diving Ducks, in rising from the water, it patters along for a bit before clearing, but once on the wing its flight is fast; it looks shorter and darker than the Canvas-back and its wingbeats are somewhat more rapid. A flock of Redheads, kept in sight for a distance of 50 miles from a parallel moving train, were timed at the speed of 42 miles an hour. Had these been chased, as by an aeroplane, their speed would undoubtedly have increased, at least for a certain distance.

Like Canvas-backs, when feeding, these Diving Ducks are much set upon by Baldpates and American coots, which, being poor divers themselves, and being exceedingly fond of the roots of aquatic plants, gather among the flocks of Redheads to rob them of the food which they bring to the surface. The thieving Baldpates do, however, make repara-

tion; they are nervous, excitable birds, quick to take alarm, and often by their cries and rapid flight warn the trusting Redheads of the approach of danger—in the form of the gunner, and to his chagrin. Redheads are inquisitive birds and decoy willingly except when in company with the suspicious, wary Baldpates.

The Redhead is a bird of the open waters, and on its migrations it is to be looked for in the larger bays and lakes. It "rafts" in huge flocks well out from shore during the day and comes in closer to feed in the late evening and early morning. The males are often quite noisy and, whilst floating out in the open in compact flocks, may be heard loudly uttering their deep-toned *me-ow*, which is the precise imitation of the voice of a large cat.

The autumn migration is well under way in October. Redheads usually follow close on the heels of the Canvas-backs and, although they generally migrate alone, towards the end of the season they are often found in association with the scaups. In the spring, the middle of March sees them on their way north and they arrive on their breeding grounds just as the ice is breaking up in the sloughs and swamps of their summer range. In their winter resorts near the sea coasts they prefer the inland fresh-water ponds and rarely venture out to sea. The Redhead is one of the least maritime of all the Diving Ducks. Sometimes flocks will winter in the vicinity of the Great Lakes, where they often perish of starvation through the freezing of the smaller lakes in which they have settled. They are hardier than the Canvas-backs, however, and seem to fare better under these conditions than does that species.

Ring-Necked Duck

Nyroca collaris

(Ni-ró-ka, kol-á-ris)

Colour Plates Nos. 18 and 21. Downy Young No. 34.

SCIENTIFIC NAME

Nyroca, Latinized form of the Russian word Nirok or Nyrok, meaning a diving duck; *Colloris*, Latin, pertaining to *collum*, the neck, collared.

COLLOQUIAL NAMES

IN LOCAL USE: Bastard broadbill; bastard redhead; black duck; blackhead; blackie; blackjack; blackneck; bluebill; buckeye; bullneck; bunt; butterball; canard noir (black duck); creek redhead (female); dogy; fall duck; marsh bluebill; moonbill; mudduck; pond bluebill; raft duck; ringbill; ring-billed duck; ring-billed blackhead; ringbill bluebill; ring-billed shuffler; ringneck.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and neck*, black glossed with purple iridescence, in some lights, greenish iridescence; feathers of *crown*, long and elevated, giving a crested effect; narrow chestnut collar around lower neck, incomplete behind; *chin*, with white triangular patch; *bill* (fig. 44), dark grey blue, with black tip,

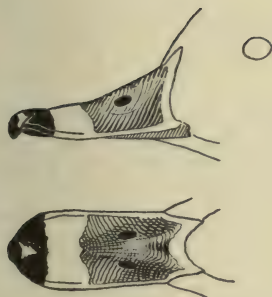


FIG. 44.

Bill of Ring-necked Duck

edges often narrowly white; two narrow bluish-white rings on bill, one at base and one near tip; bill, up-curved, shorter than head, about twice as long as wide; eye, orange yellow. *Body.* Chest, back and rump, black; scapulars, black, glossed with green; breast, white, merging into brownish black on belly; sides, greyish in effect due to fine, dusky and white vermiculations; with folded wing, white of breast appears to form a white crescent in front of wing; feet, greyish blue to light buffy grey, webs blackish. Tail, slaty brown, upper and under coverts, black. Wings. All coverts, greyish brown, glossed with green; primaries, dusky brown, darker at tips; secondaries, with pearl-grey speculum sometimes narrowly bordered behind with dusky and white; tertials, outer webs, greenish black, inner webs, greyish; lining, white and grey; axillars, white.

ECLIPSE PLUMAGE: The moult into eclipse starts in July or August and is at its height in September. The eclipse plumage, in general, resembles that of the female, but is darker. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: From the eclipse plumage, in which it resembles the female, the adult male in early autumn commences a moult into the winter plumage. The wing is as in winter plumage. In early stages the male is recognizable by the considerable amount of black on the head, though this is still mixed with brown on cheeks, throat and neck; black feathers are becoming more numerous on back and scapulars; the chest is taking on the black plumage of winter but the feathers are tipped with white, producing a mottled appearance; some vermiculated winter-feathers may be seen on the sides. By early November almost full winter plumage has been attained, with only a few white feather-tips remaining in the chest and some brown feathers on the flanks.

ADULT FEMALE. Head, greyish brown, darker on crown; cheeks, lighter brown; chin, throat, and area around base of bill, mottled whitish, throat sometimes clear creamy white (whitish area around base of bill less clearly defined than in female Scaups); hindneck, reddish brown; foreneck, mottled greyish brown; whitish ring around eye, and pale line behind eye (which may be indistinct); bill, same as that of male; eye, brown to yellowish brown. *Body.* Back, reddish brown, to dusky brown on lower back and rump; scapulars, reddish or dusky brown, longer ones dusky with greenish gloss; chest and sides, brown, feathers edged with buffy and white, giving mottled effect; breast, white, mottled with brownish grey and shading into dusky brown on belly; feet, same as those of male. Tail, dark sooty brown; upper coverts, blackish brown; under coverts, brown, with longer feathers whitish, freckled with brown. Wings. All coverts, brownish grey; primaries, dusky, darker at tips; secondaries, with pearl-grey speculum, bordered behind with dusky and white; tertails, brown; lining and axillars as in male.

JUVENILE. In early autumn sexes are alike and similar to adult female but darker on upper parts; white tips to breast-feathers narrower, breast more mottled in appearance. Young male has chest-feathers, dusky black, edged with buffy, while in adult and young females these are brown, edged with buffy. During September and October sexes differentiate rapidly; new black feathers progressively replace the brown feathers on head, neck, back and scapulars of young

male, and white vermiculated feathers appear among the brown feathers of sides. By end of December young male is nearly in fully adult plumage, with the two rings on bill, but the collar hardly visible. *Wing of Both Sexes.* As in adult female but young male shows more greenish gloss to *coverts* and *tertials*.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A small duck, with black upper-parts and chest, and white breast and grey sides. Chief distinguishing features (a) hind toe with lobe, (b) two bluish-white rings on bill, one at base and one at tip (fig. 44), (c) grey speculum, (d) vague chestnut collar on lower neck.

Superficially like male Scaups but has black back instead of greyish, as in those species.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A small, brown, duck, with a white breast. Chief features (a), (b), (c) same as male, (d) whitish ring around eye and whitish area at base of bill.

Very similar to female Redhead but that species lacks the clear white eye-ring and the two white rings on the bill. Superficially resembles the females of Canvas-back and Scaups, which are also brown-backed, white-breasted ducks. The whitish area on face near base of bill, less clearly defined than in female Scaups.

FIELD MARKS



ON THE WATER. The male appears as a very black duck, but with grey sides that seem almost white; the white crescent in front of bend of wing is noticeable at a considerable distance. Due to the long feathers of the crown, the head presents a puffy appearance. At close range, or when viewed through glasses, the white rings on the bill can be noticed. The males appear very similar to the male Scaups but can be told by their darker backs, and differently shaped heads. The female is brown with paler cheeks and if close, shows clearly the white eye-ring and white rings on the bill. Female is much like females of Redhead and Scaups; if close it can be told from the former by its smaller size and white eye-ring; from the latter by its white eye-ring and by its much less clearly defined whitish face-patch near base of bill.



IN FLIGHT. Ringnecks fly in small flocks of 6 to 12 birds, in open formation and with a swift, direct flight; they alight without circling. In flight the white bar in front of the wing of the male merges into the white breast and is not seen; the grey speculum, black upperparts and white underparts are noticeable characters. Females are best recognized by their accompanying mates. On the wing both sexes resemble the Scaups and Redheads; the flashy white speculum of the former and the red head of the latter will distinguish.

VOICE. Very similar to that of the Lesser Scaups.

LIFE STORY

The Ring-necked Duck is very closely allied to the Tufted Duck (*Nyroca fulvigula*) of Europe and Asia and is so much like that species that the famed ornithologist, Alexander Wilson (1832) described it as the same. He said: "This is an inhabitant of both continents. . . . Being birds of passage, they leave us entirely during the summer." Speaking of the Ring-neck, Audubon (1840) says: "My friend the Prince of Musignano first pointed out the difference between it and the Tufted Duck in 1824." The Tufted Ducks, both male and female, have definite tufts or elongated crests, and lack the clear white rings on the bill which mark the American species, and the females are much darker brown on the upper parts.

The Ring-neck might much more happily have been called by its popular name of Ring-bill, as the band around the neck from which it received its official vernacular name is obscure, being strongly evident only in males of high plumage. The white rings around the bill, on the contrary, are not only very noticeable in hand but are conspicuous field marks, characteristic of both sexes.

Ring-necks are essentially fresh-water ducks of the interior and are uncommon along both the northern Atlantic and northern Pacific coasts. They seem to prefer the marshes and sloughs to the open lakes and streams and are less common in the broad open waters than others of the Diving Ducks. They are nervous, alert birds, like the Scaups in this respect, but even more lively. They are good divers, seeking their food, at times, in 40 feet of water. They swim lightly and rapidly and rise from the water with greater ease than do most Diving Ducks, making an unmistakable whistle of the wings as they do so.

Of the courtship of this species, Audubon (1840) says briefly: "They have an almost constant practice of raising the head in a curved manner, particularly erecting the occipital feathers, and emitting a note resembling the sound produced by a person blowing through a tube. At the approach of spring the males are observed repeating this action every now and then while near the females, none of which seems to pay the least attention to their civilities."

These ducks usually nest in wet, boggy places bordering the edges of marshes, ponds and sloughs of the interior; the nests are often barely above the level of the water, where it would seem that the eggs must frequently be threatened by wet or dampness. The nests are constructed of the material of the vicinity, grasses, reeds, bulrushes or other debris. The usual clutch is from 8 to 12 eggs, which are dark olive buff or deep olive buff in colour and are identical with those of the Lesser Scaup. The average size is 2.26 by 1.57 inches. As is usual among the ducks, both incubation and the raising of the young devolve upon the female.

About four-fifths of the food of the Ring-neck is from the vegetable kingdom. An analysis of the stomach contents of 742 of these birds, taken in 20 States and 5 Canadian Provinces, shows the average diet to be in the following approximate percentages: water lilies, 15; pond-

weeds, 13; sedges, 8; grasses, 8; smartweeds, 6; muskgrass, 5; delta duck potato, 4; coontail, 4; burr reeds, 1; miscellaneous plant food, 17; total vegetable food, 81 per cent. Insects, 11; molluscs, 6; miscellaneous, 2; total animal food, 19 per cent. As 571 of these stomachs came from the states of Florida and Louisiana alone, and as 686 were collected during the months of November, December, January and February, it is probable that a larger number of stomachs collected during the remaining months of the year and from different localities, might change, to some extent, the foregoing percentages of diet.

The Ring-neck is a first-class table bird, though on account of its appreciably smaller size it does not rank as high as the Redhead or Canvasback in the Diving Duck group. It is usually exceptionally fat and



is certainly preferable to the Scaups and Golden-eyes. In the Diving Duck group, the ones which are preponderantly vegetable feeders are the Redhead (90 per cent), the Canvas-back and the Ring-neck (80 per cent each) and the Lesser Scaup (60 per cent); all the others are mainly animal feeders. Those consuming the larger percentages of plant food are always the better from the culinary standpoint.

Ring-necks decoy readily and generally pitch right in among the wooden blocks without hesitation, circling or reconnoitering. They usually arrive in small flocks of from 3 to 12 birds, flying with great speed in an erratic manner. Since the flocks are generally in open formation, rather than bunched as in the

case of the Scaups, they do not offer such vulnerable targets. They are in no way shy and even constant gunning will not drive them away from their favourite feeding places. They show great preference for certain spots and will return again and again to a pond which they like, refusing to visit an adjacent pond which to all intents and purposes seems identical with the first.

In the autumn, migration starts before the middle of October, slightly in advance of that of the Lesser Scaups; by the end of November the last flocks have usually crossed the Canadian border. In the spring they

are not particularly early migrants but are usually well on their way in the latter part of March and April, and are on their breeding grounds before the beginning of May. Although the winter range extends to northern South America, large numbers remain in the Southern States and on the southern Atlantic and Pacific coasts, where they prefer to feed in the inland marshes, ponds, swamps, and rice fields.

Canvas-Back

Nyroca valisineria

(ni-ro-ka, val-is-i-nér-i-a)

Colour Plates Nos. 16 and 17. Downy Young No. 34.

SCIENTIFIC NAME

Nyroca, Latinized form of the Russian word Nirok or Nyrok, meaning a diving duck; *valisineria*, from *Vallisneria spiralis*, the wild celery plant, so called after Antonio Vallisneri (1661-1730) an Italian naturalist and Professor of Medicine at the University of Padua.

COLLOQUIAL NAMES

IN GENERAL USE: Canvas; can; canny. IN LOCAL USE: Bullneck; canard cheval (horse duck); grey duck; hickory-quaker; horse-duck; red-headed bullneck; shel-drake; whiteback.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and neck*, reddish chestnut, dusky on *crown*, before eyes and on *throat*; *bill*, blackish or greenish black, as long as head, three times as long as its greatest width; *eye*, red. (Many immature birds have the eye clear yellow. *Body*. *Chest and foreback*, brownish black; *back and scapulars*, white, finely vermiculated with dusky; *rump*, brownish black; *breast*, white; *sides and belly*, white, very faintly vermiculated with dusky; *feet*, greyish blue to yellowish blue, *webs*, dusky. *Tail*, brownish slate; upper and under *coverts*, brownish black. *Wings*. All *coverts*, brownish grey, vermiculated with white; *primaries*, brownish grey, darker on tips and on outer webs, sometimes flecked with white near tips of inner primaries; *secondaries*, with pearl-grey *speculum* shading into white bar behind, outer webs of inner secondaries with black margins; *tertials*, whitish, vermiculated with dusky; *lining*, white and pale grey; *axillars*, white. (In extreme cases the *tertials*, all *wing-coverts*, and most of the *speculum* are frosted and vermiculated with white speckling, which is present even on the tips of the *primaries* and primary *coverts*.)

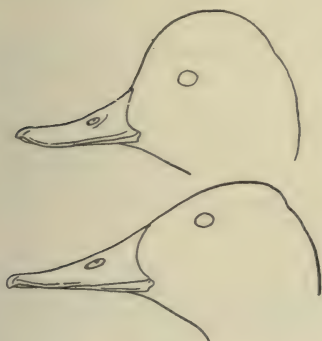


FIG. 45.—Above, Redhead.
Below, Canvas-back.

ECLIPSE PLUMAGE: The moult into the eclipse, which is only partial, starts in late June and is at its height by the first of September. *Plumage* becomes duller; *head* and *neck* mottled with dusky or brownish; *black chest*, *rump* and *tail coverts*, mixed with brown and grey. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: From the partial eclipse plumage of early autumn, described above, the adult male commences a moult towards full winter plumage. The wing is as in winter plumage. During October the reddish colour of *head* and *neck* is still somewhat duller than in full plumage, containing some old light-brown feathers. *Black chest* and *foreback* are still mottled with brown; white plumage of *back* is becoming more and more evident, appearing first on *scapulars*. *Breast* and *sides* are mottled with greyish brown. By early November many birds are in full winter plumage, but some still show brownish feathers on *back*, and white tips to *black chest-feathers*.

ADULT FEMALE. *Head* and *neck*, dull reddish to yellowish brown, darker on *crown*; *chin*, *throat* and area around and behind eye, whitish; *bill*, somewhat paler than that of male; *eye*, brown. *Body.* *Chest* and *foreback*, dull reddish to yellowish brown; *back*, *scapulars* and *sides*, whitish, barred and marked with slaty brown; feathers of *back* show some white freckling; *rump*, dusky brown; *breast*, whitish; *belly*, mottled greyish brown; *feet*, as in male. *Tail* and *upper coverts*, dusky brown; *under coverts*, whitish, marked with brownish. *Wings.* All *coverts*, dusky, finely spotted and barred with white, giving greyish appearance; *primaries*, brownish grey, darker at tips and on outer webs; *secondaries*, with grey *speculum*, inner ones margined on outer web with blackish, tipped with whitish; *tertials*, dark brown, speckled and barred with whitish; *axillars* and *lining*, white and grey.

JUVENILE. In early autumn sexes are almost indistinguishable and resemble adult female except *back* is darker and *underparts* are more mottled; *head* of young male is more russet than that of young female. *Upper back* and *scapulars* of young male show light vermiculations, less clear than in adult male; similar markings on young female very indistinct, often lacking. *Eye* of young male up to 10 or 12 weeks old, generally clear yellow (red in adult); in early-hatched birds, eye-colour change starts in late August; in late-hatched birds, in October. During September and October young male gradually acquires red *head* and vermiculated black-and-white feathers of *back*, and by November resembles adult male except *back* remains darker, colours duller, and plumage is mixed with juvenile feathers. By spring, plumage of both sexes is practically adult. *Wing of Both Sexes.* As in adult female but *coverts* of young male show more grey markings (though less than in adult male), and *speculum* is almost solidly grey. *Coverts* of young female are browner than in adult female, and the grey markings are generally entirely lacking or much less distinct.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A large, white-bodied duck, with long red neck and head, and black chest and hindquarters. Chief distinguishing features (a) hind toe with lobe, (b) sloping forehead and elongated head, (c) head and full length of neck, red, (d) bill as long as head.

Superficially the male resembles the male Redhead, but in that species the head is round and puffy, back darker, lower neck black and head a different shape.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A large, pale slaty-brown duck, with reddish-brown head, neck and chest. Chief features (a) hind toe with lobe, (b) sloping forehead and elongated head, (c) bill as long as head.

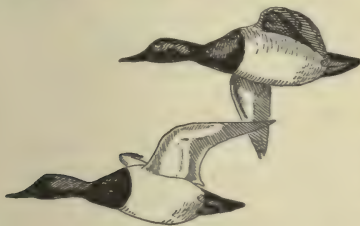
In general coloration the female resembles the female Redhead, but the shape of the head will distinguish, as that of the Redhead is round and puffy. It is still more like the female Ring-necked Duck, even to having a whitish area around the eye, but its head is a different shape and it lacks the white bands around the bill. Female Canvas-back always has some white freckling on back not present on female Redhead and Ring-neck.

FIELD MARKS

ON THE WATER. The male appears as a very large white-bodied duck with dark head, neck, foreparts, and tail. Even at a considerable distance the long bill and elongated head are noticeable and will separate from the male Red-



head. The best distinction, however, is the extreme whiteness of the back of the male. The female, though darker than the male, shows the same general outline of head and body. The Canvas-back sits low in the water like a huge grebe and dives almost as quickly; when about to dive it throws itself upward and forward to gain impetus for the descent. The female is similar to the females of Redhead, Ring-neck, Scaups and Golden-eyes; the best distinguishing feature, if discernible, is the shape of the head.



The females appear darker, but otherwise of the same general appearance as the males.

VOICE. The male has a harsh, guttural croak, or a peeping or a growling note; the female, a *quack*, like a Mallard, or a screaming *curr-row* when alarmed. The courtship note of the male is *ick, ick, cooo*; the female responding with low, guttural *cuk-cuk*.

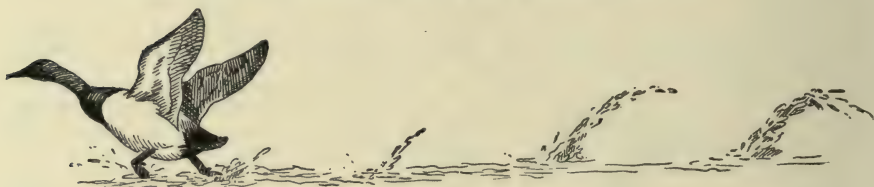
IN FLIGHT. The male is readily recognized by its large size, white body, long, slender, dark head and neck, and dark tail. The wings are long and pointed, and the flight, though apparently laboured, is swift, well sustained, and expresses great power. On their feeding grounds, they move in compact flocks in irregular formation, with much noise of the wings and rapid wing-beats; in migration the V-shaped formation is usually adopted.

LIFE STORY

The lordly Canvas-back is exclusively a North American species and is not found even as a straggler outside of the New World. It is the most famous and the most highly esteemed of our ducks, not even excepting the grand Mallard. It is a strange fact that the Canvas-back, though, from an early date, well known to the gunners of this country, having been sold on the markets for many years, was for a long time either overlooked by naturalists or mistaken for the European pochard, which it

somewhat resembles. It remained for Alexander Wilson (1832) in his "American Ornithology," to describe the species for the first time. Wilson's own account, in verse, of his first capture of the Canvas-back is as follows:

"Slow around an opening point we softly steal,
Where four large ducks in playful circles wheel,
The far-famed Canvas-backs at once we know,
Their broad flat bodies wrapt in pencilled snow;
The burnished chestnut o'er their necks that shone
Spread deepening round each breast a sable zone.
Wary they gaze—our boat in silence glides,
The slow-moved paddles steal along the sides;
Quick flashing thunders roar along the flood,
And three lie prostrate, vomiting their blood!
The fourth aloft on whistling pinions soared,
One fatal glance the fiery thunders poured,
Prone drops the bird amid the dashing waves,
And the clear stream its glossy plumage laves."



This super-duck is reputed to be the "choice of the epicure" and has achieved world-wide fame as a table bird; a reputation it will no doubt retain. There are many, however, who will argue that a prairie-fed Mallard or a prime Black Duck is quite its equal in flavour; and there is no doubt that many a lip has smacked over a fat Redhead in the belief that the "choice of the epicure" was being enjoyed.

The Canvas-back is supposed to acquire its special flavour from the wild celery buds (*Vallisneria spiralis*) which form a main item of its diet, and from which is derived its specific name "*valisineria*." It prefers the soft white roots of this plant, which are said to have a delicate flavour somewhat like that of young celery; the plants are uprooted, the roots eaten, and the leaves and stems left to float away. Wild celery is also eaten by other Diving Ducks, and it is debatable whether the unquestionably fine flavour of the Canvas-back can be attributed solely to this item of its diet. In districts on the Pacific coast where this plant is not to be found, Canvas-backs feed heavily on wapato (*Sagittaria variabilis*), and their flesh is then reputed to be just as delicious as that of the celery-feeding bird of the East. And there is another side to the story: Our king of ducks is a greedy, gluttonous feeder, not above gorging itself on the rotting flesh of the salmon on the Pacific coast, and when so feeding becomes highly undesirable as a table bird.

The food of the Canvas-back is about four-fifths vegetable matter. An analysis of the stomach contents of 427 of these ducks, taken in 25 states, Alaska, and 5 Canadian Provinces, and during every month in the year except July and August, gave the following approximate percentages: pondweeds, 30; wild celery, 9; delta duck potato, 8; grasses 8 (including wild rice, 5); sedges, 6; banana water lily, 4; burr reeds, water milfoils and muskgrass, 6; miscellaneous plant food, 10; total vegetable food, 81 per cent. Molluscs, 9; insects, 8; fishes, 2; total animal food, 19 per cent. As an indication that the Canvas-back is often a glutton, it was found that as many as 23 species of food were consumed by one bird at a single meal. On the other hand, indicating that when a satisfactory food is found it is often taken in quantity, and exclusively, it was found that 18 per cent of the birds had made their entire meal on only one species, 14 per cent on a single plant, and 4 per cent on a single animal. The Canvas-back will often dive to depths of 20 and 30 feet in its search for food.

"While feeding on *Vallisneria* (wild celery) the Canvas-back is often accompanied by other species of ducks which appreciate the same food, such as the Redhead, Baldpate, and Scaup Duck; the Redhead and Scaup can dive almost as well as the Canvas-back and so succeed in pulling up the roots for themselves; but the Baldpate has to be content with the parts discarded by the Canvas-back or with what it can steal by force; the Baldpate frequently lies in wait for the Canvas-back and, as soon as it appears on the surface with a bill full of choice



Baldpate robbing Canvas-back

roots, attacks it and attempts to steal what it can; the American coot also persecutes the Canvas-back in the same way" (Bent, 1923).

The courtship antics of the Canvas-back, condensed from an account by Dr. A. A. Allen, quoted by Bent (1923), is as follows: Several pairs of these birds were observed while gathered on a pond. The males started the performance by uttering their courtship cry of *ik, ik, cooo* and by swimming around the females, which had gathered in a little group heads together and breasts almost touching. Accompanying their frequently repeated calls the males would jerk their heads right back toward their tails, or alternatively stretch their heads and necks out along the surface of the water. When uttering their *ik, ik, cooo's* the backs of the necks would swell, the feathers rise, and the chins bulge out for an instant into a curious lump about the size of a marble. The females responded with low guttural *cuk, cuk's*.

The Canvas-back usually nests in the bulrushes and reeds of western sloughs and swampy areas. Its nest is generally cleverly concealed and is usually placed just clear of high-water level. It is an exceptionally large, well-built structure, made of dried reeds, flags and sedges and copiously lined with down. The colour of the down varies from "hair

brown" to drab, and the breast-feathers in the nest are whitish. The encroachment of civilization, with the consequent reclamation of marshy areas, is a serious menace to these and other slough-nesting ducks, which are gradually being forced further and further north to less suitable and less congenial districts, or are being altogether exterminated. Bent (1923) says: "The Canvas-back usually lays from 7 to 9 eggs, but the set is often increased, if not usually so, by the addition of several eggs of the Redhead, Ruddy Duck, or other species. The eggs when fresh can be readily distinguished by their colour, which is a rich greyish olive or greenish drab of a darker shade than that usually seen in the eggs of other species." The average size of the eggs is 2.45 by 1.72 inches. Incubation requires from 24 to 28 days and is performed entirely by the female. The males desert the females as soon as the eggs are laid and gather into large flocks in the lakes and large open spaces in the sloughs where they proceed to moult into the eclipse plumage.

When migrating, Canvas-backs fly in large, wedge-shaped flocks at considerable altitude. Tremendous power is expressed in the speed and directness of their driving flight. With long, slender heads and necks out-



stretched and with noisy and rapid beating of their sharp-pointed wings, they dash by. They are conceded to be the fastest fliers among the ducks and in one instance, while being chased by an aeroplane, were timed at the rate of about 72 miles an hour. On their feeding grounds, long morning and evening "constitutional" flights, to and fro, for

miles in each direction, are characteristic of the Canvas-backs and Redheads; a full description of these flights is given in the "Life Story" of the latter bird.

Canvas-backs in their migrations are to be looked for upon or near the larger bodies of water. During the day the flocks rest well out in the bays but in the early mornings and evenings come closer inshore to feed. The Canvas-back is essentially a diving duck and excels in this regard, often seeking its food in twenty to thirty feet of water. So strong a swimmer it is, that to retrieve a wounded bird is practically impossible; it will swim away for a long distance under water, appearing for a moment, submerging instantly, to appear again far in the distance. When diving, it uses both feet and wings for propulsion.

The Canvas-back is a wary bird and difficult to approach. In the autumn new arrivals decoy readily, but those that have been in the vicinity for some time avoid the decoys with great cleverness. Like the Redhead, it is a very inquisitive bird, and in times past this weakness was taken advantage of by hunters who used to attract these birds within shooting distance by "tolling" them in. Bent (1923), says: "An interesting ancient method of shooting Canvas-backs was by tolling them

in with a small dog, especially trained for the purpose. Some quiet place was selected where a large flock of Canvas-backs was bedded a short distance offshore, and where the hunters could conceal themselves in some suitable ambush near the water. A small dog was kept running up and down the beach after sticks or stones, with a white or red handkerchief fluttering from some part of its body, which would so arouse the curiosity of the ducks that they would raise their heads and swim in toward shore to study the cause of such peculiar actions. Often their discovery of the hidden danger came too late, for as they turned to swim away they would receive a broadside from a battery of guns and large numbers would be killed. Tolling is now prohibited in many places."

The Canvas-back is a late migrant, and often stays in the north in the vicinity of the Great Lakes until its favourite lakes and ponds are frozen, many dying of starvation as a result. Cahn (1912) describes an instance of this on Cayuga Lake in February, 1912, as follows: "A flock of 22 was approached to within 30 feet one afternoon before they gave any heed, but finally they rose heavily and flew low over the ice a distance of 60 yards, where they lit, and immediately assumed a resting posture. Two of these ducks were captured alive, both being taken almost as easily as one would take an apple from the ground. The first made one feeble flight when approached but that was all. He was followed and picked up off the ice without a struggle. The second was taken

from the ice without having made any attempt to fly. The condition of both of these birds was pitiful, to say the least. Hardly able to stand erect, and too feeble to mind what was going on around them, they sat on the ice in a more or less dazed condition. The feathers were unpreened, and those of the breast and belly were yellow and matted with grease."

The most famous winter resort of the Canvas-back is along the coastal region of Virginia and North Carolina, with its numberless estuaries and tributary streams. There they gather in vast numbers with hosts of other diving ducks to feed on the roots and seeds of the foxtail grass which grows abundantly in



these parts. Of this food Bent (1923) says: "The growth of this excellent duck food, on which the numerous duck clubs largely depend for their good shooting, is being much injured by carp and by the increasing abundance of swans; both of these species root up or trample down this grass so extensively that the feeding grounds for ducks are much injured." Migration in the autumn is usually well started by October, but Canvas-backs often linger on the way until forced south by severe cold weather. Of their migration in the autumn from Delta Duck Station, Manitoba, H. A. Hochbaum, in notes sent to the author, says: "The early flight of Canvas-backs from the north is apparently influenced by weather, as strong north winds and storms in September always bring down an early flight to the Delta Marsh. Weather, however, apparently plays no part in the mass movement of Canvas-backs southward from Delta, and, come what may—north winds, ice and snow, or mild Indian summer—the Canvas-back always leaves Delta Marsh about the middle of October." In the spring these hardy birds are among the earliest migrants and follow the break-up of the ice, starting their northward voyage in late February and early March.

Greater Scaup Duck

Nyroca marila

(*Nyroca marila nearctica*, of Peters)

(mi-ro-ka, ma-ri-la; he-ár-ti-ka)

Colour Plates Nos. 19 and 17. Downy Young No. 34.

SCIENTIFIC NAME

Nyroca, Latinized form of the Russian word Nirok or Nyrok, meaning a diving duck; *marila*, Greek, *morile*, meaning charcoal, from the pitch-black foreparts; *nearctica*, from Greek, *neo*, meaning new, and *arcto*, meaning the north, referring to the New World Arctic (in contradistinction to palearctic, meaning the Old World Arctic).

COLLOQUIAL NAMES

IN GENERAL USE: Big bluebill; bluebill. IN LOCAL USE: American widgeon; bay blackhead; bay broadbill; bay shuffler; big bay bluebill; big blackhead; big broadbill; big fall-duck; black duck; blackhead; black-headed broadbill; black-headed duck; black-headed raft duck; blackjack; blackneck; blue-billed widgeon; broadbill; broadbill bluebill; bullhead; bullneck; butterball; canvasback bluebill; deep-water broadbill; dosgris (greyback, sometimes corrupted to dogs); dos gris de mer (sea greyback); fall duck; flock duck; greenhead; greyback; lake bluebill; laker; mussel-duck; raft duck; salt-water broadbill; sea dos gris (sea greyback); sea duck; shuffler; troop duck; troop fowl; widgeon; winter broadbill.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, same as those of Lesser Scaup Duck, except that the gloss on the head is strongly green with slight indications of violet in certain lights, instead of glossed with purplish as in that species; *bill*, same colour as that of Lesser Scaup but more rugged in character, wider near

tip, and deeper and heavier at base (fig. 46), *nail*, wider and larger; *eye*, same as that of Lesser Scaup. *Body*, same as that of Lesser Scaup, except *sides*, whiter. *Tail*, same as that of Lesser Scaup. *Wings*, same as those of Lesser Scaup, except that a few of the inner *primaries* are white like the *secondaries* (fig. 47). (See Lesser Scaup Duck.)

ECLIPSE PLUMAGE: Same as that of Lesser Scaup Duck.

AUTUMN PLUMAGE: Same as that of Lesser Scaup Duck.

ADULT FEMALE. Identical in colour with female Lesser Scaup Duck; the more pronounced whitish area on the primaries, and the bill (see male) being the best distinguishing features. The head of some Greater Scaups is sepia, darker than that of female Lesser Scaup. (See Lesser Scaup.)

JUVENILE. The sequence of plumage changes is the same as in the juvenile Lesser Scaup Duck.

SPECIMEN IDENTIFICATION

See Lesser Scaup Dck, under which species the distinctions are fully detailed.

FIELD MARKS

ON THE WATER AND IN FLIGHT. Greater Scaups are difficult to distinguish in life from Lesser Scaups except under the most favourable conditions. They are, however, the Scaups of the coasts and the larger bodies of inland water, while the Lesser are abundant everywhere inland on the smaller bodies of water and in the marshes. To distinguish on the water and in flight from the Lesser Scaup and other species see Lesser Scaup Duck.

VOICE. A loud, discordant *scaup, scaup*, and a purring *pbrrrr*, oft repeated in flight. Courtship voice of male, a gentle *pa-whoo*; the female responds *chup-chup* or *chup-chup-cherr-err* or *tuc-tuc-turra-tuc*.

LIFE STORY

The Greater Scaup Duck, or "lake blue-bill" as it is commonly called, is closely related to the European Scaup. It probably derived its name from its habit of feeding on oyster or mussel beds, which in Europe are called "scaup" and in Scotland "scalp" beds; the term is of the same derivation as "scallop," the name of a well-known shellfish. Or the name may have been given on account of the bird's characteristic call—*scaup, scaup*. Or both. It is very similar to the Lesser Scaup or "little blue-bill" and in life is difficult to separate with certainty. The distinctions between the two species are dealt with fully under "Specimen Identification" of Lesser Scaup. The Greater Scaup will average about one-quarter pound heavier than its smaller relative but the sizes intergrade to such an extent that this is not a determining factor. It is a much more northern breeder than the Lesser Scaup, and is distinct in many of its habits and its behaviour. Its migration routes are different, it winters further north on both coasts and it is more of a maritime species. On its migrations it frequents the lakes, large ponds and rivers, feeding and resting on the larger waters, where it gathers in huge flocks or "rafts" during the day.

"The Scaup Duck is a bold, strong swimmer, making the best of speed even in rough weather: it is a hardy sea duck, unexcelled in its powers of swimming and diving. It is not particularly shy and can usually be approached with a little caution; but it must be hard hit to be secured, as it is tough, has a thick coat of feathers, and is such a powerful swimmer and diver that it is useless to pursue a wounded bird unless it is shot over at once. It dives quickly and swims rapidly away under water with its wings tightly closed, as many of the best divers do. I have seen Scaup Ducks, which I had dropped as if killed, sit up and shake themselves, dive before I could shoot them over, and never show themselves again; if the sea is at all rough, they can easily escape without showing enough to be seen" (Bent, 1923). When feeding it seems to dive with extreme regularity for definite periods; the dives vary in duration from 25 to 29 seconds and the period between dives from 11 to 19 seconds. When these ducks are resting on the sea it may be observed that they often sit in one unbroken line parallel to the coast, and when rising the first bird at one end takes wing and is followed in order right across the flock.

In flight these birds proceed at a rapid pace in somewhat compact formation and the sound produced by their wings is loud and rustling. On their migrations during the day they often fly at a great height but when moving about their feeding grounds they do not fly much more than 30 feet above the water. As they rise from the water the neck is straightened out and the birds run along the surface with considerable splashings for several yards, the distance covered before clearing depending on the amount of head wind, for they rise more quickly when the wind is strong. They decoy readily, as they are trusting birds, and being swift fliers they provide excellent sport for the gunner. Depending upon how they have been feeding in the recent past, they are choice or indifferent table birds, not usually as good as their smaller relatives but generally better than the Golden-eyes.

The courtship of these Scaups is described by Millais (1913), who says: "The male Scaup anxious to pair approaches the female with head and neck held up to their fullest extent, the bill being raised in the air to an angle of 50° or 60°. If the female responds to this she also lifts the neck stiffly, at the same time uttering a crooning sort of note like the words *tuc-tuc-turra-tuc*. If alarmed, or pretending to be so, she swims away quickly with powerful strokes, uttering her quacking cry, *scaar-scaar*. When paired, the female often comes up to the male and bows her head gently several times. The actual show of the male is a quick throw up of the head and neck, which is greatly swollen with air as it extends. At the summit of extension, the bird utters a gentle cry like the words *pa-whoo*, only uttered once. As he makes this show, the female sometimes swims round him, lowering the head and dipping the bill in the surface of the water and making a gentle call, *chup-chup*, or *chup-chup-cherr-err* The male also utters a very low whistle. Except the harsh loud cry of the female, all these calls of pairing Scaup are

very low in tone, and the spectator must be within a few yards of the birds to hear them."

In North America the best-known breeding grounds of this Scaup are in Alaska. The nest is usually placed not far from water and consists of a depression in the ground, lined with grasses and down. From 5 to 22 eggs have been found in the nests but the larger number were probably the product of more than one female as the usual number seems to be from 7 to 10. The colour of the eggs is olive buff or deep olive buff, about the same as that of the eggs of the Lesser Scaup and the Ring-neck. The average size is 2.46 by 1.72 inches. The period of incubation is probably from 25 to 28 days and is performed by the female alone. As soon as incubation commences the males gather by themselves and proceed to moult into the eclipse plumage.

The diet of the Greater Scaup appears to be about one-half vegetable and one-half animal food. The Diving Ducks may be classed as either predominantly vegetable or predominantly animal feeders and the Greater Scaup, therefore, comes on the border line between the two categories. It is preceded by the Lesser Scaup, whose food is 60 per cent vegetable, and followed by the American Golden-eye, which consumes only 26 per cent plant food, which amount, low as it is, is higher than that of any of the remaining members of the Diving Duck group. Of the 752 birds whose stomach analysis showed the division of food to be as stated below, nearly half had fed exclusively on animal food and about

one-quarter exclusively on plant food. It is interesting to note that one in every eight had made its entire meal on one item of plant food only, and one in every seventeen on one single animal species. The examination showed the average diet to be in the following approximate percentages: pondweeds, 19; muskgrass, 5; water milfoils, 5; sedges, 3; wild rice and other grasses, 3; wild celery, 2; miscellaneous plant food, 10; total vegetable food, 47 per cent. Molluscs (including oysters, 10), 39; insects, 7; crustaceans and miscellaneous, 7; total animal food, 53 per cent. Since as many as 310 of the stomachs analyzed came from Oyster Bay, Washington, and



were collected in an effort to ascertain the relation of the Greater Scaup to the oyster industry, a wider distribution of stomachs might alter to some extent the percentages established above. From reports of European writers it appears that the Scaups of the Old World have the same feeding habits as those of the American species. Gravel is taken freely and averages about 18 per cent of the total stomach content.

With the first frosts of early autumn, the birds which have bred further south and have hatched earlier begin to move. The main flight arrives, however, just ahead of the wintry storms, driven out by the ice and snow; the birds of this second flight are among the latest migrants. In the spring they follow the retreat of winter, and March and April are the months of greatest movement. The winter range of this species is quite extensive and more northerly than that of the Lesser Scaup. They are found wintering on the Atlantic coast from Maine south and on the Pacific coast from the Aleutian Islands to southern California. Some spend the winter on the Great Lakes. Cahn (1912) relates that these ducks often perish on account of the freezing of the lakes in which they have settled. On Cayuga Lake he once came across a flock of some 400 which were so weakened that it was almost impossible for them to rise clear of the ice. Two peculiar incidents came to his attention: "One specimen was found, while still alive, in which over half the webbing of both feet had been frozen and dropped off. Another was found frozen in a cake of ice, nothing but the head and about half the neck protruding from the mass. The duck, still alive, was chopped out, when it was found that the ice had in some way frozen over the duck, leaving water next to the body. This was undoubtedly kept from freezing by the action of the legs and the body heat. The bird was uninjured, and after being fed, seemed little the worse for its experience."

Lesser Scaup Duck

Nyroca affinis

(ni-ró-ka, a-fin-is)

Colour Plates Nos. 19 and 17. Downy Young No. 34.

SCIENTIFIC NAME

Nyroca, Latinized form of the Russian word Nirok or Nyrok, meaning a diving duck; *affinis*, Latin, meaning allied.

COLLOQUIAL NAMES

IN GENERAL USE: Bluebill; little bluebill. IN LOCAL USE: Black duck; black-head; blackjack; blackneck; blue-billed shoveler; booby; broadbill; bullhead; bull-neck; butterball; canvasback; cottontail bluebill; creek blackhead; creek broadbill; dos gris (greyback, sometimes corrupted to dogs); fall duck; flock duck; fresh-water broadbill; goshen broadbill; greenhead broadbill; greyback; howden; lake duck; little bay bluebill; little blackhead; little blackhead duck; little broadbill;

little creek broadbill; little duck; little greyback; marsh bluebill; mud bluebill; mud broadbill; poltridge; pond broadbill; raft duck; river bluebill; river shuffler; river broadbill; shuffler; summer duck; swamp bluebill; widgeon.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, black, with purplish iridescence, and greenish gloss in certain lights; *lower neck*, sometimes shows vague brownish ring; *bill*, greyish blue, with black *nail*, about same length as head; *eye*, yellow to yellow orange. *Body. Chest* and *foreback*, black, with faint purplish iridescence; *back* and *scapulars*, white, vermiculated with blackish, giving grey effect; *rump*, brownish black, with greenish sheen; *breast* and *sides*, white, the latter vermiculated with dusky; *belly*, sooty brown; *feet*, light grey blue to greenish dusky; *webs* often blackish. *Tail* and its *coverts*, blackish brown. *Wings. All coverts*, slaty brown, finely marked with white; *primaries*, greyish brown, darker at tips and on outer edge, and with pale grey-brown area in central region; *secondaries*, with white *speculum*, bordered behind with brownish black; *tertials*, dusky, with greenish iridescence; *lining*, grey and whitish; *axillars*, white.

ECLIPSE PLUMAGE: In late June or early July the moult into partial eclipse commences and is at its height by mid-September. In this plumage the *head* becomes brownish black; a white mask, as in the female, is faintly discernible; *sides* are vermiculated with brown, and *neck* shows a grey collar. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: From the eclipse plumage of September, in which it largely resembles the female, the adult male in early autumn commences a moult into the winter plumage. The wing is as in winter plumage. In early stages, the general *head* colour is dark brown, approaching the black of winter plumage, but with a few whitish feathers at base of bill, on *throat*, and around *neck*. The black *chest-feathers* are tipped with white. Increasing numbers of new vermiculated feathers can be seen on the brownish *back*; *breast* is mottled with brown, and new, vermiculated, white feathers are scattered on *sides*. By December many males are in almost full winter plumage; most individuals retaining some brownish feathers on *back* and *sides*. In backward birds these features, together with white tips on the black *chest-feathers*, may persist until spring.

ADULT FEMALE. *Head* and *neck*, brown, usually with lighter *cheek*; conspicuous white area around face at base of bill, not always continuous over top of bill (this white mask is absent or indistinct in breeding females); *bill*, dark grey, indistinct ring of bluish grey near tip, *nail* blackish; *eye*, yellow to brownish yellow. *Body. Back*, dark brown; *scapulars*, dark brown, some finely dotted with white; *rump*, blackish brown; *chest* and *sides*, greyish brown to dusky brown, feathers broadly tipped with buffy; *breast*, white or whitish, sometimes stained rusty; *belly*, greyish brown, mottled with whitish; *feet*, dark blue grey; *webs*, blackish. *Tail* and *upper coverts*, dark brown; *under coverts*, paler brown, whitish at tip and flecked with brown. *Wings. All coverts*, greyish brown; *primaries*, greyish brown, darker at tips and on outer webs, and with pale area in central region; *secondaries*, with white *speculum*, bordered behind with sooty brown; *tertials*, dark brown, faintly glossed with greenish; *lining*, grey and whitish; *axillars*, white.

JUVENILE. In September the sexes are alike and somewhat like adult female except the white face-patch does not extend across *forehead*, is less clearly defined and is mottled with brown; *head, neck and chest* are paler brown. During October both sexes make steady progress towards maturity and the purplish-black feathers begin to appear on *head and neck* of young male; the brown feathers of *back* begin to be replaced by greyish, and vermiculated black-and-white feathers appear in *scapulars*; in November the first black feathers appear in the *chest*; by February the *head* is almost adult. The plumage of both sexes is practically adult by spring. *Wing of both sexes.* As in adult female but coverts of young male show some vermiculation (as in adult male) on *lesser and middle coverts* and also on *tertials*.

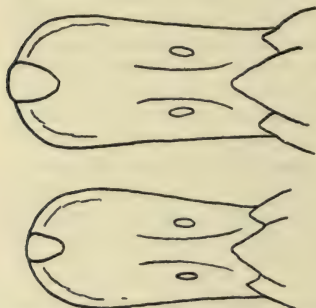


FIG. 46.—Above, bill of Greater Scaup. Below, bill of Lesser Scaup.

(c) back, whitish, vermiculated with black, (d) white speculum, but no white on primaries, though three inner ones may be palish.

Practically identical with male Greater Scaup Duck except gloss of head is predominantly purplish instead of greenish; is somewhat smaller; nail of bill is narrower, and bill less deep at base (fig. 46); respective bill measurements are: Greater Scaup, greatest width .85 to 1.05 inches, Lesser Scaup, .85 to .95 inch. The Greater Scaup has six and sometimes seven inner primaries marked with white, producing a long, white wing-stripe; the Lesser Scaup has no white on the primaries, though the three inner ones may be very pale, but seldom approaching the whiteness of those of the Greater Scaup (fig. 47). The sides of the Greater Scaup, in full plumage, are practically pure white, while the Lesser, on the average, shows much dusky vermiculation. The feathers of the crown and nape of the Lesser are longer and fuller, giving the bird a "higher-appearing" and more angular head. Similar also to the male Ring-necked Duck, but that species has black back and pearl-grey speculum.

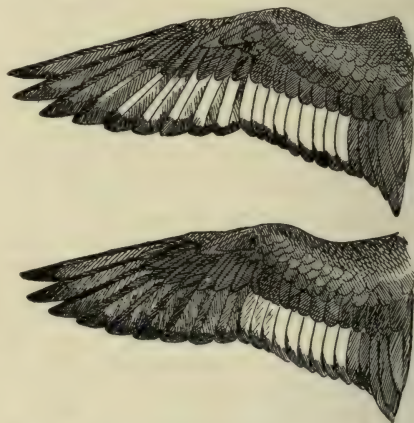


FIG. 47.—Above, wing of Greater Scaup. Below, wing of Lesser Scaup. Showing difference of white in the flight-feathers.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A medium-sized, brown duck, with a whitish breast. Chief features (a) hind toe with lobe, (b) white area across face at base of bill, (c) white speculum, but no white on primaries, though three inner ones may be palish.

Separable from female Greater Scaup by same bill characteristics as given for male, and by difference in white area of the primaries as in male. The white face-patch will separate from all other brown, white-breasted ducks except female Ring-neck, in which the white mask is present but less clearly defined; female Ring-neck has a pearl-grey speculum instead of white. (The white face of the Scaups is absent or indistinct in breeding females.)

FIELD MARKS

ON THE WATER. The males appear black in front and whitish for the remainder of the body, except for black tail. Female Scaups have brown upperparts and the chief field mark is the white "mask" around the face near base of



Left, female Scaup, Middle, male Greater Scaup. Right, male Lesser Scaup.

bill. The flashy white speculum, of both sexes, is a poor identifying mark as the flight-feathers of a sitting bird are usually concealed by the feathers of the sides. The male resembles the male Ring-neck, but that species has a much darker back. The female resembles the females of Redhead, Canvas-back and Ring-neck; the two first are much larger, and the last has a definite whitish ring around the eye, clearly visible with glasses if not too distant.

Lesser Scaups, though somewhat smaller, can be told from the Greater Scaups only when an exceptionally favourable view is obtained. The Lesser is usually found in the marshes or shallower places and the Greater on the larger bodies of water; occasionally they may be found in mixed flocks and the trained observer, aided by good field-glasses, can identify the males of the species, if seen on the water and in flight, by a combination of the following marks:—the Lesser has, (a) purple gloss on head, (b) angular shape of head. (c) vermiculated sides, (d) short white wing-stripe. The Greater has, (a) green gloss on head, (b) round smooth head, (c) white sides, (d) long white wing-stripe.

IN FLIGHT. Males are recognized by their colour pattern of black front-parts, and white sides, breast and speculum; females by the white speculum, brown upperparts and whitish breast. The flight is swift and erratic, with frequent twists and turns, and often in large flocks closely bunched. Both on the water and in the air they are lively, nervous, restless birds. Scaups may be easily confused with Ring-necks but the style of flight of the two species is quite different. See Ring-necked Duck.



Pair on left, Greater Scaups. Pair on right, Lesser Scaups. Showing difference in white on flight-feathers.

VOICE. During the day Scaups are usually silent. The male in flight utters an oft repeated, purring *pbbbr—pbbbr*, and when startled, a loud discordant *scaup*. Courtship voice of male is a low-toned whistle; of the female, a rattling, purring, *kwuh-h-h-h-h*.

LIFE STORY

Th Lesser Scaup or "little blue-bill" is exclusively a North American species with a wide distribution across the continent. It is distinctly an inland bird of the smaller lakes, ponds, and marshes, and visits the sea coasts only in winter. In appearance it is very similar to its close relative, the Greater Scaup, from which it cannot with certainty be distinguished by the casual observer, either on the water or in flight. It has a more southern breeding range, is more of an island bird than its larger relative, and will average about one-quarter pound lighter; sizes and weights of the two species intergrade to a great extent and "little" blue-bills that are heavier than "big" blue-bills are often taken. The distinctions between the two species are given in detail under the headings "Specimen Identification" and "Field Marks," above.

These Scaups, whether on the water or in the air, are lively, restless birds. They usually fly in closely bunched flocks and the flight is erratic with many twists and turns, but again, when traveling, the flight is steady and they move in a broad front or continuous line. If disturbed by gunners they will fly about from lake to lake, twisting and turning high in the air. They are exceptionally good divers and swim for long distances under water. If wounded, they are difficult to secure, as they either remain down, hanging on to some aquatic weed until drowned, or come up at a distance, where, with only the bill above the surface, they are undetectable. They swim rapidly under water, without use of the wings, which are held tightly against the sides. These Scaups are often called "raft ducks" (so are other species) from their habit of collecting in large dense flocks on the broader waters where, for hours at a time, they rest during the day. When feeding they may be noticed frequently turning the head from side to side as if glancing in each direction to assure

themselves of their safety, then down they go with surprising agility. On emerging, they shake their heads, open and flap their wings a few times then dive quickly again in search for food. They decoy readily and provide good sport for the gunner. The flesh does not rank with that of others of the *Nyroca* group (Canvas-back, Redhead, and Ring-neck) but is quite acceptable and they are generally considered good table birds.

Of the courtship of this species, Audubon (1840) says: "At the approach of spring the drakes pay their addresses to the females, before they set out on their journey. At that period the males become more active and lively, bowing their heads, opening their broad bills, and uttering a kind of *quack*, which to the listener seems produced by wind in their stomach, but notwithstanding appears to delight their chosen females." Wetmore (1920) describes the courtship display as follows: "A pair rested in the open water in front of me when suddenly the female began to swim back and forth with the head erect, frequently jerking the tip of her bill up while the male drew his head in on his breast and lowered his crest, giving his crown a curious flattened appearance. The female turned alternately toward and away from the male, sometimes biting gently at him, while occasionally he responded by nipping at her with open mouth. At short intervals she dove toward him, barely sliding under his breast, and emerged at once only a few feet away. . . . A second male that tried to approach was driven away by quick rushes though the female paid no attention to him. She continued her diving and finally at intervals the male began to dive with her. . . . When they emerged the female swam away for a short distance with the male following her. Frequently during these displays the female gave a peculiar rattling; purring call like *kwuh-h-h-h-h*, while the males whistled in a low tone."

These ducks nest on the ground near the marshy creeks, sloughs and ponds of the prairie regions of Canada and the northern central States. The nests are usually well concealed in the tall prairie grasses and consist of hollows in the ground sparingly lined with grasses and well supplied with down from the breast. The normal set of eggs is from 9 to 12 but the number will vary from 6 to 15. The colour of the eggs is dark olive buff and they are identical in appearance with those of the Ring-necked Duck; the average size is 2.25 by 1.56 inches. Bent (1923) says: "The females seemed to be very close sitters; we always flushed the bird within 10 feet of us or less; but when once flushed they seemed to show no further interest in the proceedings. The males apparently desert the females after incubation has begun and flock by themselves in the sloughs or small ponds. Lesser Scaup Ducks occasionally lay in other ducks' nests; we found one of their eggs in a Gadwall's nest and one in a White-winged Scoter's nest; but we found no evidence that other ducks ever lay in the Scaup's nest."

Of his attempts to capture specimens of ducklings, the same writer says: "While engaged in rearing and studying young ducks in Manitoba we employed Indians to catch the small young of this and some other

species which we did not succeed in hatching in the incubators." He quotes Mr. Hersey's notes as follows: "A brood of Lesser Scaup found on a small pond acted very differently from young Golden-eyes. Instead of separating they drew close together and swam back and forth a few feet. The Indians plunge into the pond, clothes and all, and drive the brood toward our end. They swim along quietly and as they near the end of the pond the Indians close in until they are within a few feet of the birds. Then suddenly the birds begin to dive, each one swimming under water past the men and coming up well out toward the middle of the pond. If the water is clear the Indians will watch the young birds swimming and catch them under water, but if muddy they all get safely by and then the whole performance is repeated. . . . It is no easy matter to catch one of these youngsters. When he realizes he is being chased he makes every effort to get back to his brothers and sisters, pattering along the surface much faster than a man can move through the water. However, they usually head him off and he then returns to diving. After a while he gets tired and diving once more swims under water until close to the shore when he crawls into the grass. Once on land he loses no time but pushes his way rapidly through the grass. Unless his pursuer is quick he will yet make his escape, but the Indians, aware of this habit, watch the tops of the grass closely, following his movements by the slight waving and soon overtake him."

The Lesser Scaup seems to show a slight preference only for vegetable food, as this forms about 60 per cent of its diet. An examination of the stomach contents of 1,051 showed the food of this species to be approximately as stated below. The specimens were collected in 30 States, Alaska, and 5 Canadian Provinces and represent all the months in the year except August. It was found that 52 per cent of the birds had fed exclusively on vegetable matter and 8 per cent entirely on food from the animal kingdom. The percentages of each kind of food were: pondweeds, 18; grasses, 10 (including wild rice, 7); sedges, 6 (including bulrushes, 5); wild celery, 5; muskgrass, 3; water lilies, 2; coontail, water milfoils,



smartweeds and arrowheads, 5; miscellaneous plant food, 11; total vegetable food, 60 per cent. Molluscs, 25; insects, 12; crustaceans and miscellaneous, 3; total animal food, 40 per cent. Fine gravel comprised about 23 per cent of the total stomach content. It was verified that these Scaups, under certain circumstances, are scavengers. A number of these birds had obviously fed at the mouth of a sewer as they were filled with slaughter-house debris, cow hair, rubber bands, paper, and undetermined drift.

These Scaups are late breeders, next to the White-winged Scoter, probably the latest; the broods do not hatch out until early in July. Since it is ten or eleven weeks before the young are able to fly, the autumn migration is necessarily late and they are amongst the last to leave their breeding grounds. The voyage south is performed in a leisurely fashion, the birds keeping just ahead of the advancing frost line. In the spring their return north is equally tardy. They are on the move in March and April, following the courses of the larger streams and rivers, and while they may be seen on their breeding grounds in May, apparently already mated, June is usually well started before they settle down to the business of building their nests. They winter in large numbers throughout the southern half of the United States. On the coasts of Louisiana and Florida the flocks become exceedingly tame and visitors to these points find great entertainment in throwing food to the trusting "wild" ducks and watching while they scramble and fight for the morsels tossed amongst them.

American Golden-Eye

Glaucionetta clangula americana

(*Bucephala clangula americana*, of Peters)

(glou-si-o-nét-a, kláng-gu-la, a-mer-i-kán-a; bew-séf-a-la)

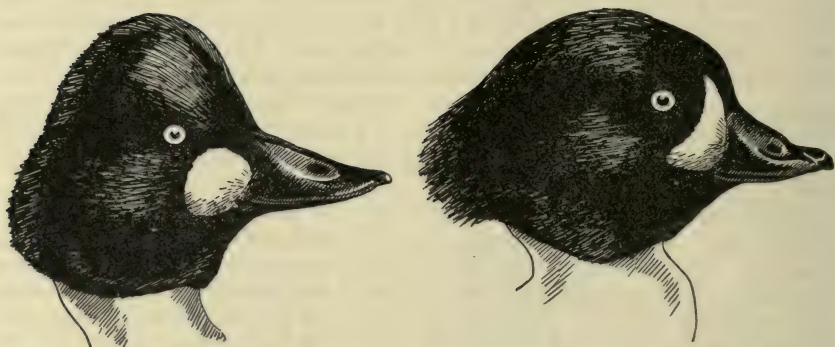
Colour Plates Nos. 20 and 21. Downy Young No. 34. Hybrid No. 36.

SCIENTIFIC NAME

Glaucionetta from Greek, *glaukion*, the juice of a plant (copper coloured), referring to the colour of the eye, and *netta*, meaning duck; *clangula*, Latin, diminutive of *clangor*, meaning a noise, referring to the whistle of the wings; *americana*, Latinized form, meaning of America. *Bucephala*, from Greek, meaning with a broad forehead.

COLLOQUIAL NAMES

IN GENERAL USE: Goldeneye; whistler; whistle-wing. IN LOCAL USE: Brass eye; brighteye; bronzehead (female and young); bullhead; California golden-eye; canard caille (quail duck); canard canadien (Canadian duck); canard yankee (Yankee duck); cobhead; copperhead (female and young); cubhead; cur; fiddler duck; greathead; ironhead; jingler; king diver; little redhead female and young); merry-wing; oyster duck; pie duck; pied whistler; pisque; plongeon; plongeur (diver); sleepy diver; tree duck; whiffler; whistle diver; whistle duck; winter duck; wood duck.



Left, head of male American Golden-eye. Right, head of male Barrow's Golden-eye.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and upper neck*, black, highly glossed with metallic green, in some lights, violet; *crest* puffy; *face*, with round white patch between eye and base of bill; *neck*, short and white; *bill*, black shorter than head; *eye*, bright golden yellow. *Body. Back and rump*, black; *scapulars*, inner, black, outer, white with black edges; *chest and breast*, white; *belly*, white, with dusky on sides at rear; *sides*, white, with longer feathers of side and *flank* narrowly edged with black; *feet*, bright orange or yellow, with dusky *webs* and *claws*. *Tail*, slaty grey to dusky, *under surface* lighter; *upper coverts*, black, tipped with whitish; *under coverts*, white, marginally slaty grey. *Wings. Lesser coverts*, forward and inner ones black, rest white; *middle coverts*, white; *greater coverts*, white, though basally black (outer surface of closed wing preponderately white); *primaries*, slaty black; *secondaries*, mainly white, outer ones blackish; *tertials*, blackish; *lining* and *axillars*, dusky.

ECLIPSE PLUMAGE: The moult into partial eclipse starts in July or August and, at its height, the plumage resembles that of the juvenile male. The *head* and *neck* become mottled and brown, the white face-patch becomes indistinct, and brownish feathers appear on the *sides*. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: From the partial eclipse plumage of the late summer, in which it resembles the juvenile, the adult male, in early autumn, commences a moult into winter plumage. The wing is as in winter plumage. In early stages, greenish-black feathers appear on the *head* among the mottled-brown feathers of the eclipse plumage, and the white spot before the eye contains some dark feathers; the *neck* and *sides* are marked with brownish; many new, black feathers may be found on the *back*, and black and white ones on the *scapulars*, these parts, however, are still mottled with brown. The moult continues progressively through November, and by early December most adult males are in full winter plumage; backward individuals retain a few brown feathers on *back* and *sides*.

ADULT FEMALE. *Head*, snuff brown, less puffy than that of male; *neck*, short, with broad white collar incomplete behind; *hindneck*, grey, washed with brown, continuous with brown of head; *bill* shorter than head, dusky in autumn, and dusky with yellowish tip in spring, or sometimes mostly yellow in this season (a female taken near Toronto in early November, 1941, had bill all-yellow; colour,

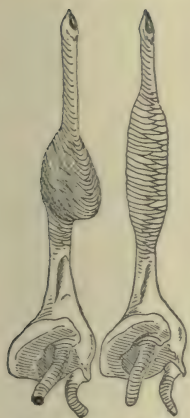


FIG. 48. — Windpipes of male Golden-eyes, showing (left) enlargement in that of the American species, lacking in that of Barrow's (right)

ochre or yellow ochre, dusky along cutting edge, with some dusky blotches on basal part); eye, paler yellow than in male. *Body.* Chest, foreback, scapulars and sides, ashy or brownish grey, feathers edged with whitish; back, sooty black, feathers tipped with ashy; rump, sooty black; breast, white; belly, greyish; feet, same as those of male but paler. Tail and upper coverts, greyish to greyish brown, the latter tipped with ashy; under coverts, whitish, marked with dusky. Wings. Coverts, pattern variable but in full plumage, forward lesser coverts, grey, tipped with whitish, rear ones, white; middle coverts, grey, tipped with white; outer greater coverts, blackish, central ones, white, blackish basally and usually at tips, inner ones blackish; primaries, brownish black, darker on outer webs and at tips; secondaries, outer one greyish black, middle ones white, inner ones and tertials, blackish; lining and axillars, dark greyish black.

JUVENILE. In early autumn the sexes are similar and closely resembles the adult female; young male is much larger than young females, the head is darker and more mottled with dusky; it has less grey on breast and a suggestion of the white face-patch is evident. Very slow progress towards maturity is made, and even by spring young male still resembles adult female. By second autumn, after the summer moult, the sexes closely approach adult plumage but this is not fully achieved until during second winter. *Wing of Male.* As in adult female, but lesser coverts dusky, edged with light grey; some middle coverts, white, with grey shafts, others dusky, with white tips; greater coverts, black, the central ones broadly tipped with white; three outer secondaries, dusky, next one tipped with white, others white; primaries, dusky; tertials, black. *Wing of Female.* As in adult female, but middle coverts, greyish, dusky basally; greater coverts, generally lack black tips usually present on adult female.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A medium-sized duck, with black head and back, and white body. Chief distinguishing features (a) hind toe with lobe, (b) greenish-black head, with round, white spot between eye and base of bill.

The round, white face-patch will separate the male from any other species. This Golden-eye closely resembles Barrow's Golden-eye but is easily distinguished from that species by the fact that the similarly-located white spot is crescent-shaped in Barrow's instead of round. In the present species the head is glossed with green and in Barrow's with purple. The bill is larger and less pointed than that of Barrow's. In the American species both the adult

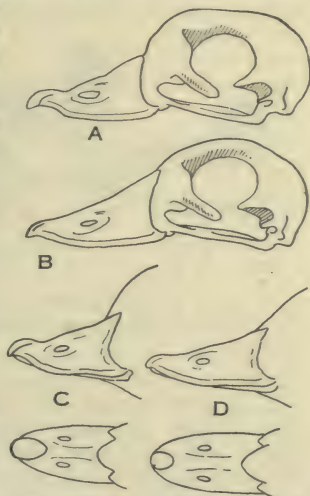


FIG. 49. — (A) Skull of Barrow's. (B) Skull of the American. (C) Bill of Barrow's. (D) Bill of the American.

and the juvenile have a peculiar bulbous enlargement of the windpipe which Barrow's lacks (fig. 48); this does not apply to females. Another anatomical difference is that Barrow's has a protuberance on the skull at the forehead which can be readily felt with the finger (fig. 49); this is lacking in the American species.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A medium-sized duck, with brownish-grey upper-parts and white breast. Chief features (a) hind toe with lobe, (b) snuff-brown head, (c) short neck, with white collar incomplete behind.

The snuff-brown head and white collar of the American Golden-eye will prevent confusion with any other species except the female Barrow's Golden-eye, which, however, has the following distinguishing features:—(a) head, slightly darker brown to purplish brown, (b) grey of chest extends further into breast, (c) lesser and middle coverts lack pronounced white area present in those of American species, (d) protuberance on skull, as in male, sometimes present but very indefinite (many females vary even in above points and it is often impossible to separate them from the American species), (e) bill, more pointed and stubby, nail, more prominent, (f) in spring, bill, all yellow, sometimes with dusky markings; this colour sometimes evident as early as November or December, with the assumption of the full breeding plumage. In the American, the bill, in the spring, is usually only tipped with yellow, but see "Description."

FIELD MARKS

ON THE WATER. The male appears mainly white, with some black on the back; it has a large-appearing black head, a short, thick neck, and generally



Left, male American Golden-eye. Above, female. Right, male Barrow's Golden-eye.

stocky build. The round, white spot between the eye and the bill is generally noticeable. The female appears much smaller than the male, has the upper-parts brownish grey, a large brown head, and a white collar; it is more easily identified than most females. The male floats lightly on the water; while the female sits much lower, the underparts being markedly submerged.

At a distance, males may be mistaken for the other black-and-white ducks, such as male Mergansers and Buffle-head. The smaller Buffle-head may be told by the large, triangular white patch on the head. The Golden-eye is a stocky, short-necked duck with large, round head, while the Mergansers are long and rakish, with long bill and long, snaky head. From Barrow's Golden-eye the male is told by having a round, instead of crescent-shaped, white spot in front of the eye. The shape of head in the males of the two Golden-eyes is very different, due to the more luxuriant crest of Barrow's combined with the skull protuberance. The best mark is that the American appears predominantly white because of the much

whiter scapulars and the fact that the sides are only narrowly edged with black. Barrow's on the water is predominantly black because the scapulars are only spotted white and the sides are broadly edged with black. The female American cannot be told from the female Barrow's in life.

IN FLIGHT. The male in flight shows more white of body and wings than any other duck except the American Merganser; by this and by its big, round, black head and short, thick neck, it is easily recognized. The grey-backed female, with its big brown head, white collar and white wing-patch and breast, is also readily identified. The male of the Barrow's species shows more black in the wings but is difficult to separate from the male American in flight. Both on the water and in flight Golden-eyes are very active birds. The flight is exceedingly swift and strong and is accompanied by an extraordinary vibrant whistling of the wings, audible at a great distance; by this characteristic wing-sound they can usually be identified. The flocks are generally small and, when rising from the water proceed for a long distance at low elevation, circling several times to gain height.



Below, American Golden-eyes. Above, male Barrow's Golden-eye.

VOICE. Not very voluble birds. The male has a penetrating cry, *speer, speer*; the female, when startled, a sharp *cur-r-rew*, and a low-pitched *quack*, harsher than that of the Mallard. The courtship voice of the male is a harsh, rasping, double note *zzee-at*, and a flat vibrant *paaap*; that of the female is a single whistling *peep, peep*.

LIFE STORY

The American Golden-eye is widely and aptly called "whistler" or "whistle-wing" on account of the penetrating, vibrant, whistling sound made by its wings when in flight. A closely allied race is found throughout Europe and Asia. Our American variety is widely distributed across the continent and is one of the best known and most plentiful of all American wild fowl. This duck, Barrow's Golden-eye and the Buffle-head belong to a group of pied ducks which are very similar in appearance and habits; some authorities group the three into a single genus, *Bucephala*. The American Ornithologists' Union, however, shows the Buffle-head as a separate genus and it is so dealt with in this work, though the great similarity of the three ducks is worthy of note.

"Of all wing music, from the droning of the rufous hummer to the startling whirr of the ruffed grouse, I know of none so thrilling sweet as the whistling wing-note of the Golden-eye. A pair of the birds have been frightened from the water, and as they rise in rapid circles to gain a



from a remote and secure lodging place to feed in some favorite stretch of wild water, one guesses at their early industry from the sound of multitudinous wings above, contending with the cold ether" (Dawson, 1909).

Golden-eyes are very playful and, as spring approaches, noisy. Currier (1902) describes their play in a pool on the Mississippi River as follows: "The swift current is constantly forcing them toward the ice at the lower end of the pool, so that they are obliged to take wing and go to the other end of the ice hole frequently. They rise on rapidly beating wings, the clear whistling ringing across the dark water and white ice fields, and, scurrying upstream in irregular groups, drop in again with a noisy splash. This drifting down and flying back again seems to be enjoyed as much by the ducks as is coasting by the children. . . . It is a scene of great activity from daylight until darkness sets in. . . . As winter abates and the increasing warmth causes the ice to give way, followed by the great break-up as the ice goes out, the duck is at its best. The moving ice fields keep them on the watch, and as the open water they are in narrows, they spring up and fly over the grinding, churning mass, drop into the next clear space upstream. The instant they hit the water they go on playing, chasing each other, and diving to great distances."

The courtship of the Golden-eye, as described by Townsend (1910) is as follows: "One or more males swim restlessly back and forth and around a female. The feathers of the cheeks and crest of the male are so erected that the head looks large and round, the neck correspondingly small. As he swims along, the head is thrust out in front close to the water, occasionally dabbling at it. Suddenly he springs forward, elevating his breast, and at the same time he enters the most typical and essential part of the performance. The neck is stretched straight up, and the bill, pointing to the zenith, is opened to emit a harsh, rasping, double note, *zzee-at*, vibratory and searching in character. The head is then quickly snapped back until the occiput touches the rump, whence it is brought forward again with a jerk to the normal position. As the head is returned to its



Courtship of Golden-eyes

place the bird often springs forward kicking the water in a spurt out behind, and displaying like a flash of flame the orange-colored legs." Alford (1921) says: "Though the habit of lying more or less prone upon the water is common to most females of the *Anatidae* when they desire to pair, the duck Golden-eye carries this performance beyond all normal bounds; her behavior on such occasions being, indeed, scarcely less amazing than that of the drake. With neck outstretched and her body quite limp and apparently lifeless, she allows herself to drift upon the surface exactly after the manner of a dead bird. When first I witnessed this maneuver I was completely deceived, for she remained thus drifting toward the shore and with the male swimming round her for fully 15 minutes before actual pairing took place."

This Golden-eye invariably nests in the cavity of a tree or dead stump and whenever possible will select a site near, and preferably over, water. Any kind of cavity, so long as it is large enough to admit the duck, will be occupied; the height from the ground will vary from 5 to 60 feet and the nest itself may be as much as 15 feet below the opening. It is surprising through what a small entrance the duck will squeeze; Brewster (1909) states that he once saw a nest to which the only access was by means of a vertical slit so narrow and jagged that it would barely admit his flattened hand; and Bent (1925) says that he measured an opening which was only 3 inches wide by $4\frac{1}{2}$ inches deep; he also states that the female is alleged to desert the nest if the eggs have been handled, and that this proved to be the case in the only two instances in which he tried it. The number of eggs varies from 5 to 19 but the usual clutch is from 8 to 12; they are pale green to olivaceous green in colour and are quite different in appearance from those of any other duck except the Barrow's Golden-eye. The average size is 2.35 by 1.71 inches. The incubation period is about 20 days and incubation is performed by the female alone. The Hooded Merganser frequently lays its eggs in the nest of this species.

It has been stated that the mother duck transports her young from their high nest by carrying them either in her bill or upon her back to the nearest water. Phillips, however, who investigated this subject more thoroughly than anyone else, could find no convincing evidence to substantiate such statements. The normal method of descent is for the young ducklings to jump from the nest-entrance when they are about two days old. Macartney (1918) describes one such performance, and there are many well accredited accounts of a similar nature. He says that one afternoon a mother duck "was seen at the foot of the tree, standing on the ground. She gave several low quacks or calls, and out of the hole in the tree overhead promptly tumbled about a baker's dozen of fledgling ducks. They were unable to fly, but were sufficiently grown to be able to ease their fall to the earth, and not unlike a flock of butterflies, they came down pell-mell, fluttering and tumbling, some of them heels over head, until they reached the ground, unharmed. The tree was nearly but not quite perpendicular, so they were unable to scramble down. The old bird gathered them in a bunch and piloted them along

the fence for some 3 or 4 rods to the river. Down the rocky shore they went and into the water. The old duck then sank low in the water and the ducklings gathered over her back in a compact clump. She took them across the bay to a bed of rushes, some 10 rods distant, where they disappeared from sight."

A study of this species was made by Brewster (1900); his assistant, R. A. Gilbert, gives the following account of the young birds leaving the nest: "At 6:45 the old duck appeared at the entrance to the nest, where she sat for five minutes moving her head continually and looking about in every direction included within her field of vision; then she sank back out of sight, reappearing at the end of a minute and looking about as before for another five minutes. At the end of this second period of observation she flew down to the water and swam round the stub three times, clucking and calling. On completing the third round she stopped directly under the hole and gave a single loud cluck or call, when the ducklings began scrambling up to the entrance and dropping down to the water in such quick succession as to fall on top of one another. They literally *poured* out of the nest much as shot would fall from one's hand. One or two hesitated or paused for an instant on reaching the mouth of the hole, but the greater number toppled out over the edge as soon as they appeared. All used their tiny wings freely, beating them continuously as they descended. They did not seem to strike the water with much force." [See also "Life Story" of the Wood Duck.]

Nearly three-quarters of the food of the Golden-eye is animal matter. The stomach contents of 395 of these ducks collected in 25 States, Alaska and 5 Canadian Provinces, in every month of the year except June and August, shows the average diet to be in the following approximate percentages: crustaceans (including crabs, 16), 32; insects (including caddis flies, 12), 28; molluscs, 10; fishes, 3; miscellaneous, 1; total animal food, 74 per cent. Pondweeds, 9; wild celery, 3; spatterdocks, 1; grains (bait), 1; bulrushes, 1; miscellaneous plant food, 11; total vegetable food, 26 per cent. It was found that during May and October more than half the food was vegetable, yet, strangely, in July the smallest quantity (10.5 per cent) of plant food was consumed. Gravel comprises about 25 per cent of the total gizzard content.

When migrating, Golden-eyes fly in small flocks and usually at a considerable altitude. They are very strong and active on the wing and may often be seen high in the air, circling about the lakes and over the tree tops, singly or in pairs, the female generally in the lead. When rising from the water they circle several times to gain height and seldom travel close to the water. They are good divers and usually dive with the wings held tightly to the sides. When feeding, they dive with ease and grace, disappearing without the slightest splash, but if alarmed they plunge roughly and rapidly under. Millais (1913), describing a peregrine making a stoop at these Golden-eyes, says that the duck when they first saw the peregrine were about 80 yards in the air; they immediately closed their wings and dropped, as if shot, to the surface of the water.

"On striking the water there was no pause, they just passed out of sight, rising nearly 100 yards away and flying low over the water."

The same writer describes how, from a bridge, he watched a male Golden-eye diving to feed in the clear water. "On reaching the bottom, it at once commenced to turn the stones over with the bill, and from under these, various water insects were found or caught as they attempted to escape. Sometimes it would find a small batch of young fresh-water mussels, and these it would devour very quickly one after the other, like a duck taking grain out of a pan. It never stayed under water more than a minute, even when finding food abundant in one spot, but came up, rested for a moment or two on the surface, and dived again. All food was swallowed where it was found, and small pebbles and fairly large stones were pushed over in the search." Golden-eyes timed in their dives when feeding were found to remain under for about 21 seconds with an average of 13 seconds between dives.

In spring these birds are early migrants; April is the month of greatest movement but, weather permitting, many will start in March and follow the iceline on their way north. Summer is spent on a breeding range that extends from Newfoundland to Central Alaska, the large majority breeding north of the Canadian border, though an appreciable number nest in many of the Northern States. In autumn the main flight is southward and southeastward toward the Atlantic coast. Flocks may be seen in migration about the beginning of October and the flight continues until about the middle of November. Ordinarily the full-plumaged old males are the last to arrive, not abandoning their northern haunts until the icy waters are frozen over. In winter large numbers of these ducks visit the Atlantic coast from Maine to South Carolina and the Pacific coast from the Aleutian Islands to southern California. It is a common sight to see flocks all through the winter on Lakes Michigan, Ontario and Erie. As is the case with other species, many Golden-eyes are caught in the ice on the large lakes of the interior and perish; they are so hardy, however, that fewer of them than of other species suffer this fate.



Golden-eyes are wary birds and, while they will come to decoys, the deception must be well-nigh perfect or they will veer off just before coming into gunshot—and will not return. They are, ordinarily, second-rate table birds, though upon occasion, when they have been feeding suitably, they compare favourably with the better varieties. Young birds of the first autumn are best; they are generally tender, of good flavour and about on a par with Scaups.

A morning shoot of Golden-eyes is aptly described by Bent (1925): "At last a black speck is dimly discerned in the distance against a pink cloud; on it comes straight toward the blind, and we recognize it as an old cock Whistler, the advance guard of the morning flight; he circles, sets his wings and scales down over the decoys; in our eagerness we betray ourselves by a sudden movement; he sees us and scrambles upward into the air to escape, but it is too late, the guns speak and the first kill is scored. Soon a small flock of five birds comes in, the shrill whistling of their wings sending a thrill of pleasure through our chilled veins; they scale down toward the decoys, but see the blind, wheel, and fly off without offering us a shot; they settle in the water away off among the floating ice and it is useless to stalk them. We have been too conspicuous to the keen eyes of the birds and must conceal ourselves better; so we pile up more ice around the blind and keep more quiet. Better luck follows in consequence, for the ducks decoy well, if their suspicions are not aroused, and during the next two hours we have good sport. By the time the early morning flight is over, an hour or two after sunrise, we have had enough of it and are glad to return home with a small bag of the keen-witted Golden-eyes."

Barrow's Golden-Eye

Glaucionetta islandica

(*Bucephala islandica*, of Peters)

(glou-si-o-nét-a, is-lán-di-ka; bew-séf-a-la)

Colour Plates Nos. 20 and 21. Downy Young No. 34.

SCIENTIFIC NAME

Glaucionetta from Greek, *glaukion*, the juice of a plant (copper coloured), referring to the colour of the eye, and *netta*, meaning duck; *islandica*, Latin, meaning of Iceland. *Bucephala*, from Greek, meaning having a broad forehead. The vernacular name "Barrow's" is in honour of Sir John Barrow (1764-1848), secretary to the British Admiralty, and one of the founders of the Royal Geographical Society; he was an ardent promoter of Arctic Exploration.

COLLOQUIAL NAMES

IN GENERAL USE: Whistler. IN LOCAL USE: Cock pie-duck; goldeneye; Rocky Mountain golden-eye; whistle-wing; wood duck.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, black, glossed with rich purple iridescence; *crest*, puffy; *face*, with crescent-shaped white spot between eye and base of bill; *neck*, short, white; *bill*, black, shorter than head; *eye*, bright yellow. *Body.* *Back* and *rump*, black; *chest*, *breast* and *belly*, white; *sides*, white below, broadly black above, producing a black band on upper part of sides; short *inner scapulars*, white on inner webs, black on elongated outer webs; longer *outer scapulars*, white, margined with black on both webs; the effect of this scapular coloration is a series of white spots over closed wing; *feet*, orange yellow, with dusky *webs* and *claws*. *Tail*, blackish slate; *upper coverts*, black, sometimes slightly tipped with whitish in high-plumaged birds; *under coverts*, white marginally blackish brown. *Wings.* *Lesser coverts*, black; *middle coverts*, white; *greater coverts*, black, center ones with white tips; *primaries*, brownish black on inner webs, black on outer webs and at tips; *secondaries*, mainly white, outer ones, blackish; *tertials*, blackish; *lining* and *axillars*, sooty grey.

ECLIPSE PLUMAGE: Corresponds to that of American Golden-eye.

AUTUMN PLUMAGE: Corresponds to that of American Golden-eye.

ADULT FEMALE. See "Specimen Identification" of female American Golden-eye.

JUVENILE. In early autumn the sexes are alike and similar to adult female. In November the young male acquires *inner scapulars* similar to those of adult male and the white face-patch begins to show; during the winter white feathers progressively replace the brown juvenile feathers on the *chest*. By spring the young male is more or less like the adult, except feathers of *hindneck* and *sides*, and the black-and-white outer *scapulars* are not complete, and the *wing* is still immature. By the following November, after the summer moult, both sexes are in full adult plumage. *Wing of Male.* As in adult female, but *lesser* and *middle coverts*, dusky, some of the latter tipped with light grey; *greater coverts*, black, the central ones

broadly tipped with white; three outer *secondaries*, black, the next one tipped with white, others white; *primaries* and their coverts, dusky black. *Wing of Female*. See Juvenile American Golden-eye.

SPECIMEN IDENTIFICATION

See American Golden-eye.

FIELD MARKS

See American Golden-eye.

LIFE STORY

Barrow's Golden-eye is exclusively a North American species and occurs in the Old World only as a straggler. It is aptly called Rocky Mountain Golden-eye, as this continental divide is the centre of its abundance. It is unusual amongst our wild fowl in that it possesses two distinct and widely separated ranges; it breeds in comparatively large numbers in the West, from south-central Alberta to Colorado and California, and is entirely absent as a breeder across the continent until it is found in Labrador, where nesting colonies are again located. The peculiarity of its two widely separated ranges finds a parallel in the case of the Harlequin Ducks which have an Atlantic as well as a Pacific coast breeding range. These birds are sub-specifically distinct due to minor differences of featheration, while the eastern and western Barrow's are indistinguishable one from another.

In its Rocky Mountain range it sometimes nests at elevations as high as 10,000 feet above the level of the sea. In the small, mountain lakes in British Columbia these birds gather for their courtships and nesting, and by the middle of April each little lake has its flock of courting Golden-eyes (the young of neither sex breed before the second summer). Munro (1918) says that the display "is attended by much solemn bowing on the part of the drake, with a frequent backward kick, sufficiently strong to send a jet of water several feet into the air. His violet head is puffed out to the greatest possible extent, and altogether he is a handsome bird as, in a frenzy of sexual excitement, he swims up to the soberly attired duck. Sometimes the entire flock will commence to feed as if at a given signal, and again all the birds will simultaneously take wing and circle about the lake several times before once more splashing down to resume their courtship." After mating, "the males acted as if extremely jealous of each other and on several occasions left their mates and engaged in spirited encounters. They rushed together over the surface with much splashing, and when about to meet rose upright and buffeted each other with their wings."

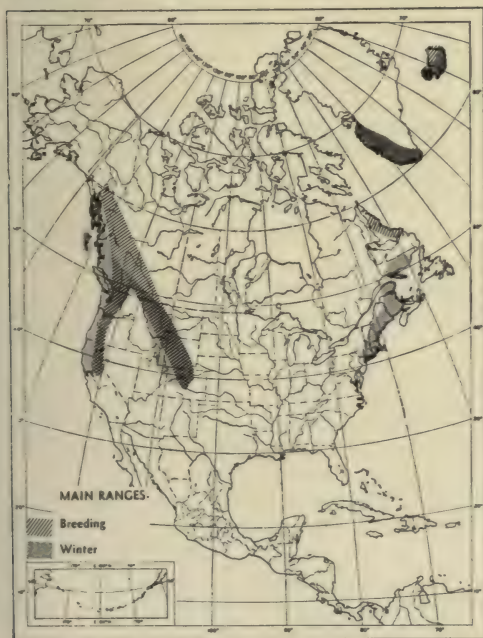
Like the American Golden-eye, this species is a tree nester, making its home in natural cavities in trees or dead stumps, or may select a deserted woodpecker's or squirrel's hole in which to take up its abode. Whenever possible, suitable trees in the vicinity of water will be selected, but when such are not available, sites may be chosen in wooded country sometimes half a mile away from the nearest water. The greatest con-

centration of nests will be found on the shores of lakes which are strongly alkaline, no doubt because such waters are rich in crustaceans to which these ducks are particularly partial. The nests are at times in holes as high as 50 feet above the ground. In Iceland, where this species also breeds, the nests will, on account of the scarcity of trees, be found in cavities in cliffs or in the walls of peat shelters built for sheep. The eggs are practically indistinguishable from those of the American Golden-eye; they are of the same greenish colour, but are slightly larger and average 2.41 by 1.73 inches. Incubation is performed by the female alone and she is a very close sitter having, at times, to be removed by force if one wants to see the eggs. From their nests high above the ground the young reach the water in the same manner as that described in the "Life Story" of the American Golden-eye and of the Wood Duck.

Over three-quarters of the food of Barrow's Golden-eye is of the animal kingdom. The analysis of the stomach contents of 81 of these birds gave the following approximate percentages: insects, 36; molluscs, 19; crustaceans, 18; fishes, 1; miscellaneous animal food, 4; total animal food, 78 per cent. Pondweeds, 8; wild celery, 2; miscellaneous plant food, 12; total vegetable food, 22 per cent. By comparison, the American Golden-eye consumes less insects (28 per cent) and less molluscs (10 per cent) but more crustaceans (32 per cent) than the present species. When feeding in shallow water, searching for crustaceans under the stones, they remain below for periods of 15 to 20 seconds, coming to the

surface to swallow the crawfish they obtain. In the deeper water, where they hunt for molluscs, which, in contrast, they consume beneath the water, they remain below for longer intervals, ranging from 50 to 55 seconds. By the end of the winter the feathers of the forehead are often found to be partially rubbed off due to constant abrasion against the stones by their method of foraging.

In habits and behaviour Barrow's closely resembles the American species, the similarity even extending to the same love of frolicking in the rapids and fast flowing streams; this characteristic is shown to be the same both in the Icelandic, and the widely separated Rocky Mountain



groups of the species. The wings of the Barrow's whistle in flight as do those of the Whistler but possibly the sound is neither quite so loud nor so metallic. The flight is similar and the flocks usually do not consist of more than a dozen birds, except in the mating season. An outstanding difference in the behaviour of the two species is that the Barrow's are comparatively tame and trusting birds which come unhesitatingly to decoys and seem to show little fear of man. This is probably due to the fact that they are less sought by gunners. The anatomical differences between the two species are given under the head "Specimen Identification of the American Golden-eye.

In spring the groups that winter on the Pacific and Atlantic coasts begin their short voyage to their respective breeding grounds as early as weather permits. Those that have wintered on the Pacific coast move to the Rocky Mountain district and those from the Atlantic coast to the Labrador Peninsula. This species is much more common in the West, and the majority spend the summer on a breeding range that lies mainly in and around the Rocky Mountains. The migration in the autumn is so short that it is merely a shift from the more northern part of their range to the southern and towards the coasts; the movement takes place during October and November. In the winter those that breed north of the St. Lawrence shift to the Gulf of St. Lawrence and as far south as the coast of Maine. On the Pacific coast they winter as far south as central California and a few winter on the Okanogan, Gardiner, and Yellowstone Rivers.

Buffle-Head

Charitonetta albeola

(*Bucephala albeola*, of Peters)

(ka-ri-to-nét-a, al-bé-o-la; bew-séf-a-la)

Colour Plates Nos. 18 and 21. Downy Young No. 34.

SCIENTIFIC NAME

Charitonetta from Greek, *charitos*, meaning grace, and *netta*, meaning a duck; *albeola*, Latin, diminutive of *albus* meaning white. Hence a graceful white duck; *Bucephala*, from Greek, meaning having a broad forehead.

COLLOQUIAL NAMES

IN GENERAL USE: Butterball. IN LOCAL USE: Bumblebee dipper; butterbowl; butter duck; cock-dipper; dapper; didapper; dipper; dipper duck; diver; dopper; hell-diver; king butterball (the male); marionette (puppet); robin dipper; Scotch dipper; Scotch duck; Scotchman; Scotch teal; shotbag; spirit; spirit dipper; spirit duck; widgeon; woolhead.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, black, glossed with purple, violet and green, except for large white patch starting below eye and extending over hind crown; *head*, markedly crested and puffy; *lower neck*; white; *bill*, blue grey, much shorter than head, edge of upper mandible, sometimes pinkish or yellowish, *nail*, tip and base, sometimes dusky; *eye*, dark brown. *Body*. *Chest* and *sides*, pure white, with upper feathers of sides narrowly edged with black; *back*, black, occasionally with a few narrow white feather tips; *rump*, black centrally, grey on sides; *scapulars*, inner, black, black, outer, white, edged with black on outer margins; *breast* and *belly*, white, usually washed with pale ashy grey; *feet*, flesh colour, with black *claws*. *Tail*, dark grey, usually tipped with whitish, outer feathers usually margined with white; *upper* and *under coverts*, pale grey. *Wings*. All *coverts*, mainly white, with some dark feathers mostly along forward edge of wing; *primaries*, black on outer webs, paler on inner; *secondaries*, white, the outermost blackish; *tertials*, glossy black; *lining* and *axillars*, mottled with dusky and white.

ECLIPSE PLUMAGE: The male in late summer goes into a partial eclipse plumage, said to resemble that of the American Golden-eye. The full-plumaged wing is renewed. The bright colours of the head are largely lost and the white head-patch becomes somewhat obscured.

AUTUMN PLUMAGE: From the partial eclipse plumage, the male in autumn commences a moult into the full winter plumage. The wing is as in winter plumage. New, iridescent purple or bronze feathers will be found on the head, and black ones on the back; throughout the autumn the amount of new feathers increases as the duller ones of the eclipse are moulted and the white head-patch becomes more distinct. Full winter plumage is completed in the late autumn. Full details of eclipse and autumn plumages in the male Buffle-head are not well known due to lack of specimens.

ADULT FEMALE. *Head* and *neck*, dark greyish brown, darkest on *crown*; *cheek*, with white patch behind and below eye; *bill*, bluish grey to dusky; *eye*,

dark brown. *Body. Back, scapulars and rump*, dark greyish brown, almost black on middle of back and rump, feathers of back sometimes with lighter edgings; *chest, sides and belly*, ashy grey; *breast*, dull white, greyish at rear; *feet*, purplish grey. *Tail*, sooty grey, often with slight whitish tips and edgings; *upper and under coverts*, sooty grey. *Wings. Lesser and middle coverts*, dark greyish brown; *greater coverts*, also dark greyish brown but usually with white spots on outer webs of one or more central feathers, the central feathers sometimes almost all white with dark tips; *primaries*, blackish brown *secondaries*, outer ones, blackish brown, inner ones, white; *tertials*, dark greyish brown; *lining*, mottled whitish and brown; *axillars*, mottled dusky and white.

JUVENILE. In first autumn the sexes are alike and resemble the adult female except that the colours are duller and browner and the white cheek-patches are smaller. In young male the upper feathers of the *sides* are narrowly edged above with dusky. Young male is larger than young female. The young male soon shows a more conspicuous white head-patch and larger head but progress to maturity is slow and even by spring the plumage is only partially adult and the *wing* still immature; the *head* of young male shows large white patch, but few of the purple head-feathers have developed. By second autumn after the summer moult both sexes are fully adult. *Wing of Both Sexes.* As in adult female but *greater coverts* of young male with more white than in adult female.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very small duck, with a large black-and-white head, white body and black back. Chief distinguishing features (a) hind toe with lobe, (b) very small size, (c) puffy, dark head, with triangular, white head-patch, (d) wing, centrally white.

The male is difficult to confuse with any other duck.

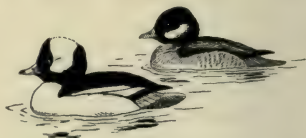
AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very small, dark-backed, white-breasted duck. Chief features (a) and (b) same as in male, (c) white speculum, (d) white face-patch behind eye.

The male and female Ruddy Duck are almost as small, and in their drab winter plumage bear a superficial resemblance to the female Buffle-head. The females of Scaup and Harlequin are also drab-coloured, white-breasted ducks, but are much larger.

FIELD MARKS

ON THE WATER. The Buffle-heads are among the smallest of the ducks and are only slightly larger than the little Teals. The male appears largely white, with an enormous black head marked with a conspicuous white, triangular patch. Except for the white patch on hand, the male looks like a small edition of the Golden-eye. The male Hooded Merganser with its prominent white crest and similar size is often confused with the male Buffle-head, but its darker body, black neck, and pointed bill will separate. The tiny, dull-coloured, female Buffle-head will be recognized by its diminutive size and puffy, brown head, with white face-patch; the white speculum is seldom noticeable on the folded wing. The female, at a distance, looks like a miniature female Golden-eye.



IN FLIGHT. The little male, with its striking black-and-white markings, large white wing-patch, big head and short neck, is easily identified. The drab little female is recognized by its dark head with small white face-patch, white speculum and whitish underparts. In the autumn Buffle-heads usually fly in small flocks made up largely of females and juveniles, with two or three old drakes. The flight is generally close to the water, is swift and direct, with rapid beats of the little wings. Unlike most Diving Ducks they rise quickly and neatly from the water, sometimes from below the surface, bursting into the air

at full speed. They alight with a splash and then glide along the surface to a standstill.

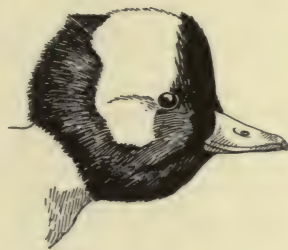
VOICE. A rather silent bird; the male has a guttural rolling note and a weak, squeaky call; the female, a hoarse *quack*, and a *guk, guk, guk, guk*, in a long series.

LIFE STORY

The handsome, hardy, vivacious little Buffle-head is another species that is peculiar to North America. It was originally called "buffalo-headed" on account of its disproportionately large head. It is commonly known as "butterball" and "spirit duck," and, as Bent (1925) says, the propriety of applying the latter name to this sprightly little duck "will be appreciated by anyone who has watched it in its natural surroundings, floating buoyantly, like a beautiful apparition, on the smooth surface of some pond or quiet stream, with its striking contrast of black and white in its body plumage and with the glistening, metallic tints in its soft, fluffy head, relieved by a broad splash of the purest white; it seems indeed a spirit of the waters, as it plunges quickly beneath the surface and bursts out again in full flight, disappearing in the distance with a blur of whirring wings."

The same writer says: "The flight of the Buffle-head is exceedingly swift and direct, generally at no very great elevation above the water, and is performed with steady and very rapid beats of its strong little wings. It rises neatly and quickly from the surface of the water and sometimes from below it, bursting into the air at full speed.

When alighting on the water it strikes with a splash and slides along the surface. It generally travels in small, irregular flocks made up largely of females and young males, with two or three old drakes." The ease with which this species rises from the water is unusual in the Diving Duck group and is similar to the style of the surface feeders, though the upward bound is neither so high nor so vertical.



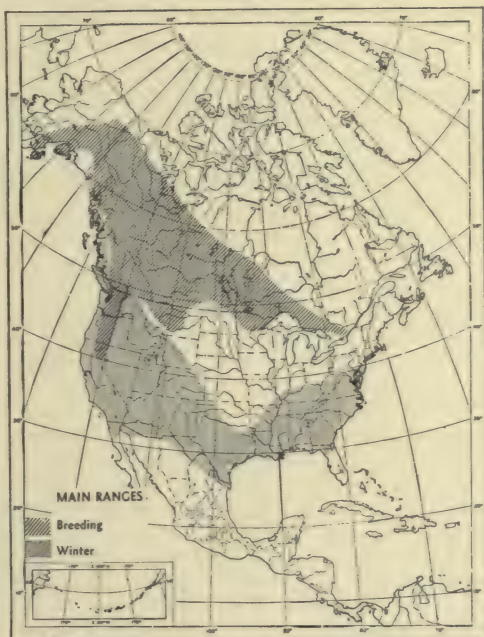
It dives with the celerity of a grebe and under the water the wings are held closely to its sides; when about to dive, the puffy feathers of the head are tightly compressed. Alford (1920) timed the Buffle-head in its dives and found that it remained under water from 15 to 23 seconds usually about 20; the period between dives, when feeding, was from 4 to 8 seconds. It is credited with being able to dive at the flash of a gun and so save itself from being shot. The Buffle-head decoys readily, dropping in among the wooden blocks without fear or hesitation. It is one of the incidental ducks that come to bag as it is not much sought or valued as a game bird. Though generally very fat, the flesh is often fishy and unpalatable.

The manner in which a duck hawk finished off a little Buffle-head is described by Hubbard (1893), who says that the little duck was swimming around in a slough "when one of those pirates of the air, a duck hawk . . . came in sight. Without hesitating an instant, he made straight for my little friend and swooped at him. His long talons came down with a clutch, but they closed on nothing, for the duck was under the water. Undaunted the hawk hovered overhead, and as the water was clear and shallow, he could follow every movement of his prey. Again the duck came up; the hawk swooped to seize him, each move being repeated in quick succession and each dive becoming shorter and shorter. It was evident that the poor little hunted creature was getting desperate, for the next move he made was to come out of the water flying. The hawk promptly gave chase. There was some clever dodging in the air, but the duck, frightened and tired, soon saw that his swift pursuer was getting the best of it, so he closed his wings tight against his body and dropped like a stone into the water and plunged out of sight. Now comes the beginning of the end. While he was under the water he either saw the hawk hovering over him or else he became bewildered, for he came again out of the water flying. Like lightning the hawk struck; there was a muffled 'squawk' and the tragedy was ended."

"On bright, warm days during the latter part of April or early in May the courtship of this species may be studied with some hope of success, though long and patient watching through powerful glasses may be necessary. The males are quite quarrelsome at this season and fight viciously among themselves for the possession of the females. The male is certainly a handsome creature as he swims in and out among the sombre females, his bill pointing upward, his neck extended, and his beautiful head puffed out to twice its natural size and glistening in the sunlight. Standing erect he struts about, as if supported by his feet and tail, with his bill drawn in upon his swelling bosom, a picture of pride and vanity, which is doubtless appreciated by his would-be mate. Suddenly he dives beneath her and on coming up immediately deserts her and flies over to another female to repeat the process. He seems fickle or flirtatious in thus dividing his attentions, but perhaps they have not been graciously received or he has been rebuffed. Sometimes he becomes coy and swims away until she shows interest enough to follow

him. Eventually he finds the one best suited to him and the conjugal pact is sealed" (Bent, 1925).

The Buffle-head belongs to the small group of ducks that are habitually tree nesters. The nests are usually placed in the deserted holes of flickers or other woodpeckers in trees as near to the banks of ponds and streams as can be secured. The cavity may be as high as 40 feet or more above the ground or water. In certain areas where trees are scarce, and only when forced by such a circumstance, it will lay its eggs in a hole in a bank, after the manner of the Kingfisher. The entrance to the nest may be a hole as small as $3\frac{1}{2}$ inches in diameter, but as the female is one of the smallest of ducks it is easier to understand how she can pass through such a small aperture than it is to visualize the much larger Golden-eye squeezing through openings of much the same size. The eggs vary in colour from ivory yellow to pale olive buff and the usual clutch is 10 or 12, though the number will range from 6 to 14. The average size is 1.91 by 1.37 inches. The manner in which the young of the tree-nesting ducks descend from their nests, high above the ground, is described in the "Life Story" of the American Golden-eye and the Wood Duck.



"The Buffle-head obtains its food by diving, usually feeding in small companies so that one or more remain on the surface to watch for approaching dangers while the others are below; sometimes only one remains above, but it is only rarely that all go below at once; should the sentinel become alarmed it communicates in some way with the others which come to the surface and all swim or fly away to a safe distance" (Bent, 1925). Practically four-fifths of the food of this species is of the animal kingdom. An analysis of the stomachs of 282 of these birds collected in 24 States, Alaska and 5 Canadian Provinces, and taken in every month of the year except June and September, gave the following approximate percentages: insects, 41; crustaceans, 17; molluscs, 16; fishes, 4; miscellaneous animal food, 1; total animal food, 79 per cent. Pondweeds, 7; miscellaneous plant food, 14; total vegetable food, 21 per cent. The relative amounts of ani-

mal and vegetable food consumed by the Buffle-head are approximately the same as those taken by the closely related Golden-eyes. The little Buffle-head is another of those ducks which gorge themselves on the maggoty flesh of rotting salmon in rivers of the Pacific coast.

In the spring the little Buffle-head, though a hardy bird, is a late migrant and gradually follows the retreat of winter. It moves north just ahead of the Blue-winged Teal and, with the Ruddy Duck, is the last of the Diving Duck group to start the spring migration. The main summer breeding grounds lie in the wooded region north and west of the Canadian prairies, where it congregates in comparative abundance. In the autumn, contrary to its practice in the spring, it is a late migrant, demonstrating its reputation for hardiness by remaining until driven forth by the cold of approaching winter. It moves south with the hardier winter ducks late in October and November. In winter it remains as close to the frost line as it can find open water in the interior, and on the coasts is to be found as far north as the New England States and British Columbia where it usually occurs in little flocks of 10 to 50 individuals.

Old-Squaw
Clangula hyemalis
 (kláng-gu-la, hi-e-mál-lis)

Colour Plate No. 22. Downy Young No. 34.

SCIENTIFIC NAME

Clangula, the diminutive of Latin *clangor*, meaning a noise, (referring to the voice of this duck); *hyemalis*, Latin *hiemalis*, of or pertaining to *hiems*, meaning winter or wintry. Hence, a noisy winter duck.

COLLOQUIAL NAMES

IN LOCAL USE: Callithumpian duck, refers to the birds' varied notes (improvised bands of uncertain musical ability are called callithumpian bands); caccawee (also spelled cockawee, kakawi, and in other ways); coween (also spelled cowheen, cowne, and in other ways); granny; ha-ha-way (Cree Indian name from the note, as are so many of the names of this species); hell's-chicken; hound; jack-owly; jay-eye-see; kla-how-yah (Indian name); knockmolly; longtail; long-tailed duck; mammy duck; mommy; o-i; old-billy (males); old granny; old-injun (males); old-mammy; old-molly; old-wife (sometimes written alewife or contracted to ol-wye—the term o-i, above, probably is an extreme shortening of old wife); organ duck; pintail, quandy; scoldenore; scolder; singing duck; siwash; son-son-sally duck; south-southerly (a name much varied as s'o'ther, southerland, southerly, south-south-southerly, etc.); squaw; swallow-tailed duck; teet; uncle Dick, winter duck.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: (In adult birds the change to this plumage is usually completed by the end of September.) *Head* and *neck*, white, except for greyish patch on *cheek* surrounding eye, and dark brown patch behind eye extending to *upper neck*, where it shades to buffy brown; *bill*, decidedly shorter than head, pinkish to pinkish orange near tip, basal half and *nail*, black, nail broad and well-developed; *eye*, variable, bright carmine, reddish hazel, light brown, straw or white; *eyelids*, white. *Body. Upper chest* and *foreback*, white, occasionally pearly grey on foreback; *scapulars*, long and pointed, pearl grey; *lower chest*, *forebreast*, *hindback* and *rump*, blackish brown; *breast* and *belly*, white; *sides*, pale pearl grey, longer feathers edged with white; *feet*, bluish grey, with dusky webs. *Tail*, two middle feathers, greatly elongated and pointed, brownish black; remaining tail-feathers, dusky, edged with white, becoming more white toward outside; *upper coverts*, blackish brown centrally, white at margin; *under coverts*, white. *Wings. Entire upper surface*, brownish black, without trace of white or lighter colour except *speculum*, chestnut brown; *under surface* of flight-feathers, dusky; *lining* and *axillars*, greyish brown. (Entire plumage presents piebald appearance.)

SUMMER PLUMAGE: (Change to this plumage is usually completed in May.) *Head* and *neck*, brownish black; pattern of side of head, variable, generally with ashy patch from bill to in front of and below eye, with whitish patch behind and above eye, sometimes the whitish patch is reduced to small area behind eye; rarely the ashy patch covers side of head, except for a white eye-ring; *bill* and *eye*, same as in winter. *Body. Back* and *scapulars*, blackish brown, feathers of fore-back and scapulars broadly edged with rufous brown to buffy; *chest*, *forebreast* and *rump*, blackish brown; *breast* and *belly*, white; *sides*, pearly grey, longer feathers

edged with white; *feet*, same as in winter. *Tail* and *Wings*, same as in winter plumage but usually worn and faded.

ECLIPSE PLUMAGE: There is no regular eclipse plumage. Instead, there are the two plumages described above. The moult into summer plumage takes place in April and May, and the moult into the winter plumage is during August and September. (It is held by some that the plumage worn during the summer is a prolonged eclipse plumage.)

ADULT FEMALE. WINTER PLUMAGE: (The full plumage here described has greatly variable stages.) *Head* and *neck*, mostly white or whitish but feathers of *forehead*, *crown*, an area on *cheeks*, *chin* and sometimes on *foreneck*, tipped or washed with brownish black; *bill*, greyish black to dusky green, darker towards tip, much shorter than head; *eye*, brownish, pale grey, yellow or white. *Body. Back*, *rump* and *scapulars*, dusky brown, with broad, cinnamon feathertips; *chest*, washed with dusky brown and cinnamon; *breast* and *sides*, white, latter with greyish tinge; *belly*, white; *feet*, greyish blue or greenish grey, with dusky *webs*. *Tail*, ashy brown, feathers of middle, darker brown; *upper coverts*, outer ones, white, inner ones, ashy brown, *under coverts*, white. *Wings. Lesser coverts*, dusky brown; *middle coverts*, buffy, marked with brown; *greater coverts*, dusky brown with buffy tips; *primaries*, dusky brown; *secondaries*, dull chestnut, outer ones greyish; *tertials*, dark brown, with chestnut wash; *lining* and *axillars*, greyish brown and silvery grey.

SUMMER PLUMAGE: *Head* and *neck*, the general effect is more dark greyish brown than white, reverse of winter condition. The whitest areas are a white ring around eye, a spot at base of bill, a line back of eye and a spot on side of neck; *bill* and *eye*, same as in winter. *Body*. Same as in winter, except feathers of *foreback* and *scapulars* have greyish edges unless worn or bleached; *chest*, greyish brown; *feet*, same as in winter. *Tail*, same as in winter, but usually bleached and more uniform. *Wings*, as in winter, but all parts bleached and worn, with little buffy or chestnut.

JUVENILE. By September the sexes are alike and resemble the adult female in summer plumage, except *head* and *neck* are a light brownish grey, darker on *crown*, and feathers on *foreback* and *scapulars* lack greyish edges. During November, new feathers in the plumage of the young male are rapidly appearing, and the *head* begins to resemble that of the adult male. During the winter, progress towards maturity takes place by an almost continuous moult, and by the end of March young male resembles adult male in winter plumage but lacks the long *tail-feathers*. After the moult, which takes place in August and September, the plumage of both sexes is that of the adult in winter plumage. *Wing of Both Sexes.* As in the adult male but *speculum*, dusky, rather than chestnut brown; *tertials*, shorter and with rounded, not pointed, tips.

SPECIMEN IDENTIFICATION

MALE. General effect: In winter, a small, chubby, piebald duck, mainly white, with a very long tail. In summer, a chubby, dark brown, white-breasted duck with a very long tail. Chief distinguishing features (a) hind toe with lobe, (b) greatly elongated middle tail-feathers, (c) piebald markings of brown and white (winter plumage), (d) bill, short and stubby, half pinkish or pinkish orange and half black.

The only other duck with an elongated tail is the Pintail, which belongs to the subfamily of River and Pond Ducks and lacks the spatulate hind toe of the Diving Duck group.

FEMALE. General effect: In winter or summer, a small, chubby, brown-backed, white-breasted duck, with a piebald head. Chief features (a) hind toe with lobe, (b) head and very short neck piebald, brown and white, (c) bill, very short, about one inch, and stubby, (d) whole body, in both plumages, piebald.

The female can hardly be confused with any other duck.

JUVENILE. See "Description."

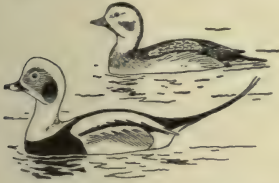
FIELD MARKS

ON THE WATER. Whether in winter or in summer plumage, the medium-sized, chunky, adult male Old-squaw can be identified instantly by its long tail. In winter, the plumage of the male is piebald but mainly white, with white head and neck; in summer, its plumage is mainly brown, with brown head and neck. The male sits low on the water, with head erect and tail well elevated except when feeding, when the tail is lowered to the surface. The trim, male Pintale, in spite of its long tail, is difficult to confuse with this duck on account of its entirely different build. The female Old-squaw has head and neck mainly white, white

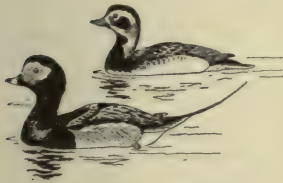
sides and dark back; these markings and its thickset, chunky build will identify it.

IN FLIGHT. In winter plumage the male is easily recognized on the wing by its long tail and mainly white plumage with dark wings and chest; in its summer garb it is mainly dark brown with white breast. The female is mainly white and is the only such duck with solidly dark wings; this marking is very evident in flight. The style of flight is distinctive; Old-squaws fly low to the water, in small flocks in irregular formation, with many twistings and turnings, showing breast and back alternately. The wing-beats are short and rapid. Old-squaws alight by dropping suddenly in with a great splash.

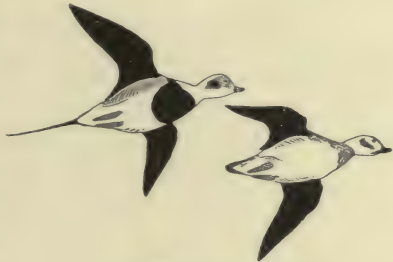
VOICE. Extremely garrulous, chatty birds, gabbling and calling continuously with many musical notes. They have a large and varied vocabulary: *ow-owly, owly, owly*, in long succession; *ow-owdle-ow; ow-ow-owdle-ow; ah, ah, ah*, rapidly; *ong, ong-onk; a-leedle-a, a-leedle-a* repeated; *ar-hi-look*; sounds resembling the words, *south, south-southerly*; and many others calls and variations. The calls are made on the water or in flight. The



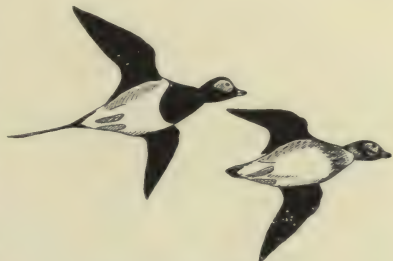
In winter plumage



In summer plumage



In winter plumage



In summer plumage

courtship voice of the male is said to be a succession of deep notes like the baying of hounds in the distance; the female's is a low *quack*.

LIFE STORY

The Old-squaw, that happy-go-lucky little bird, is aptly described by its scientific name, *Clangula hyemalis*, which means "noisy winter duck." It is known across the northern portion of both hemispheres and possesses a personality all its own. The male is widely and commonly known as the "long-tailed" duck. Friendly, chatty, gay, and active, its merriment is at its height in the springtime, that season of joy, love and life, and wanes but little throughout the year. Though its arrival on the coasts in the autumn is the harbinger of winter, yet its musical, resonant calls ringing out in the distance, and its antics and carefree play enliven and cheer all who are lucky enough to be in its vicinity. As Rich (1907) puts it: "Winter is close at hand. There is a sting in the wind, a nip in the air, and the fingers are numb and blue as they hold the gun barrels. But out on the water, careless of wind or wave, rides a flock of 'squaws' making always a merry chatter. Ever and anon some of their number rise against the breeze to dart off at lightning speed, apparently in the mere enjoyment of flight, for, circling a half a mile about, they plump down again among their comrades, all the time noisily calling to each other."

The Old-squaw is justly notorious for its voice; it is a noisy, garrulous species at all seasons, and on account of this characteristic has received many colloquial names which suggest its varied calls. It has been dubbed the "song bird" among ducks, and some of its notes are so harmonious and rhythmical that it received many years ago the well-merited title of "organ duck" from the fur traders of the Upper Yukon. An enumeration of some of its various calls, which are easy to recognize but difficult to describe, will be found under the heading "Field Marks" above. W. E. Ekblaw in notes quoted by Bent (1925) says: "The vibrant resonance of the call is undoubtedly due to the peculiar development of the voice box. At the base of the trachea [windpipe], just at the junction of the bronchial tubes, is a coiled enlargement resembling a mellophone, with a tightly stretched membrane along one side, probably the mechanism by which the volume and quality of the call are produced."

The females are very irregular in the times at which they are ready for pairing. Thus only one or perhaps two females in a large flock may be well advanced at one time in their summer plumage and breeding instincts; these are the ones specially sought by the males. Millais (1913) says he has "noticed a bunch of 8 or 10 females swimming apart and not a male going near them, whilst 10 or 15 males will crowd around some particular female and lavish upon her all their acts of charm.



Courtship of Old-squaw

The most common attitude of the male in courtship is to erect the tail, stiffen the neck to its fullest extent, and then lower it toward the female with a sudden bow, the bill being held outward and upward. As the head curves down, the call is emitted Many males will crowd around a female, all going through the same performance. It is not long before a fight starts amongst the males, so that the lady of the tourney is in the midst of a struggling, clamorous mass of squabbling knights, each endeavoring to show his qualifications to love by his extravagant gestures or strength So impetuous and gallant are the males of this species that they will chase each other for long distances, falling often in the sea and sending the spray flying; down they go under the water and emerge almost together on the surface to continue the chase in mid-air. I have twice seen a male when flying seize another by the nape and both will come tumbling head over heels into the sea in mad confusion."

The Old-squaw nests on the tundras of the sub-Arctic regions. The nest is placed on the ground in small cup-like hollows, sometimes in the grass near available pools but frequently at considerable distances from water, it is always well lined with down from the mother's breast. The down of this duck is said to be nearly as valuable as that of the eider ducks, possessing almost equally desirable qualities of lightness and resiliency. The female is a close sitter, not flushing until the intruder is almost upon her. When leaving her nest, great care is ordinarily taken to conceal the eggs from view and they are cleverly covered with the dark brown down, grass and debris so that the nest matches the surroundings and is almost invisible. The number of eggs is from 5 to 17, but the usual clutch is from 5 to 7; the average size is 2.09 by 1.56 inches. Colour of the eggs varies from olive buff to deep olive buff. Incubation requires about three and a half weeks and is performed by the female alone; the male remains close at hand until the eggs are about to hatch, when he flies off and joins the other males on the sea coasts.

The native people and the foxes, jaegers, and gulls are always on the hunt for nests and take a heavy toll of the eggs of this and other species. Normally the Old-squaw lays only one set of eggs each season, but when the nest has been robbed, a second or even a third attempt is made to raise a brood; this is why the small downy young are sometimes encountered as late as the middle or end of August. The lateness of the autumn migration gives ample time for these delayed broods to mature before the time for the southward journey arrives.

Not only are continual depredations made upon the eggs of these ducks, but the young ducklings are constantly subject to attack by jaegers, skuas, and glaucous gulls. Millais (1913) relates having witnessed an attack by two parasitic jaegers or "Richardson's skuas" on a brood of Old-squaw ducklings; he says: "One skua swooped down and distracted the mother's attention to one side by hovering over the water. The anxious parent opened her bill and gave a series of grating calls. As the marauder came to the level of the water the long-tailed duck with

raised crest made a fierce rush of a few yards at it and in this short space of time the second skua swooped down, picked up a nestling, and swallowed it alive, head first. The frantic mother then darted in the other direction when the skua that had first attacked nimbly picked up a duckling and swallowed it whilst mounting into the air." Possibly as a means of protection against attacks of this sort, two mother birds frequently join their flocks and may often be seen swimming about, one mother leading and the other following in the rear.

Another instance of the extraordinary parental devotion of this species is recounted by Conover (1926) who says: "A brood of five was encountered, and desiring to collect them, with the help of an Eskimo boy I attempted to drive the young ashore in a narrow bay. This failed, so I began to shoot them. Every time one was killed the female would rush up and grab the downy with her bill. Shot after shot was fired, but the female refused to leave, until finally she was collected also. Despite this care for their young, the mortality among the ducklings must be very high, as later it became a common occurrence to see an Old-squaw swimming about with only one young following her. Many females without broods were about."

"When searching for food, they string out in a long line and swim abreast. At a signal one at the extreme end goes down, the rest follow in regular time, never all at once, and rarely more than two or three at a time. The last one goes down in his turn with the regularity of clockwork . . . They remain under water a long time and usually come up near each other" (Turner, 1886). The duration of the dives as timed by Seton Gordon (1920) averaged about 37 seconds and the interval between dives was about 8 seconds. Both feet and wings are used when swimming under water.

Nearly nine-tenths of the food of the Old-squaw is of animal origin. The stomach contents of 227 of these ducks, collected in 13 States, Alaska, and 8 Canadian Provinces, and taken in every month except September, gave the following approximate percentages: crustaceans, 48; molluscs, 16; insects, 11; fishes, 10; miscellaneous animal food, 3; total animal food, 88 per cent. Grasses (including grain bait, 2.5), 4; pondweeds, 2; miscellaneous plant food, 6; total vegetable food, 12 per cent. Gravel averaged about one-third of the total stomach volume.

"When migrating, Old-squaws fly high in the air in irregular flocks or in Indian file, but at other times they fly close to the water or a few feet above it, but almost never in a straight line; they twist and turn suddenly, showing the back and belly alternately like shore birds, swinging in broad circles most unexpectedly. Their flight is so swift and so erratic that it is very difficult to shoot them, but they are often very tame

or stupid and are quite as likely to swing in toward a gunner's boat as away from it; then in turning they often bunch together so closely that a tempting shot is offered; I have seen as many as nine dropped out of such



a bunch at one shot. I have seen them, when shot at, dive out of the air into the water, swim for a long distance under water, and then come out of the crest of a wave flying at full speed, as if they had never broken their flight. They can rise readily off the surface of even smooth water and when alighting on it often drop in abruptly with an awkward splash. If there is a strong wind blowing they are more inclined to circle into the wind, glide down gently against it on set wings and alight with a sliding splash . . . the Old-squaw swims low in the water, but makes rapid progress even in rough water; it rides easily over the ordinary waves, but dives under the crest of a breaker with good judgment and precision" (Bent, 1925).

"These ducks have a habit of 'towering,' both in the spring and in the autumn, usually in the afternoon, collecting in mild weather in large flocks, if undisturbed, and going up in circles so high as to be scarcely discernible, often coming down with a rush and great velocity, a portion of the flock scattering and coming down in a zigzag course similar to the scoters when whistled down. The noise of their wings can be heard for a great distance under such conditions" (MacKay, 1892). In one such instance a flock of several hundred birds was observed to go up in this manner twice within an hour.

The Old-squaw is probably the most expert diver among the ducks; not only is it so quick at submerging that it disappears at the flash of the gun, but it reaches depths that would be unbelievable were they not properly accredited. There are many well-substantiated records, extending over a long period of time, of these ducks being caught by the hundreds in the gill nets of the fishermen of the Great Lakes. These nets are set at depths of 50 to 180 feet and are often over 8,000 feet in length. Regional Director Jansen, of the Biological Survey, quotes one commercial fisherman as stating that more than 1,500 of these birds were caught in a single haul in December, 1934. Eaton (1910) states that at Dunkirk, N. Y., between five and six thousand have been taken at a single haul. The ducks so caught are usually turned over to fertilizer companies where they are ground up for utilization in the manufactured product. In 1917 Dr. W. E. Saunders, investigating the reports of the large numbers of ducks taken in this manner, found at one fertilizer factory 12 tons of these ducks, estimated at 1,500 birds to the ton, or about 18,000 individuals.

The Old-squaw has no regular eclipse moult, as have most other ducks; instead it has two distinct moults, a prenuptial moult during April and May, which produces the plumage that is worn during the breeding season, and a postnuptial moult during August and September, resulting in the winter plumage in which the bird is usually seen. The Old-squaw and the Ruddy Duck are the only North American ducks that have these distinct and different plumages for winter and summer. (Some ornithologists claim that the plumage worn by the Old-squaw during the winter is really the nuptial or courting plumage, and the plumage worn during the summer is really the eclipse plumage, which is

prolonged in the case of this species. The female-like winter plumage of the male Ruddy Duck is likewise considered to be a prolonged eclipse plumage.)

In the spring, the warmth of the April sun and thoughts of domestic duties to be performed start the restless, gay gang on their northward voyage. The main summer breeding grounds on this continent extend from the mouth of the Yukon, around the Alaskan coast and across the northern Arctic. In the Autumn, Oldsquaws are among the latest migrants and come south with the cold winds and ice of October and November. Winter is at hand when these hardy little ducks arrive on their feeding grounds on the At-

lantic and Pacific coasts. On the coasts very few wander south of Chesapeake Bay on the East and the State of Washington on the West. From these points north they spend the winter in company with the Scoters, Eiders, Golden-eyes and Red-breasted Mergansers. Many winter on the Great lakes and larger inland waters, but in winter they are decidedly a maritime species and congregate on the sea coasts by preference.

Oldsquaws decoy well, and are tame, trusting birds, full of curiosity. Their flight is swift and erratic, but when bunched, as they so often are, they offer easy targets. They do not rank as table birds as their flesh is fishy and tough. Many, however, are shot every autumn, chiefly for the sport they provide by their rapid and active flight. It takes a good shot to bring down a single, travelling before the wind. These birds are tough and hard to kill and only a small portion of those that are shot are killed outright; to pursue a wounded bird of the diving ability of the Oldsquaw is useless.



Eastern Harlequin Duck*Histrionicus histrionicus histrionicus*

(his-tri-ón-i-kus)

Colour Plates Nos. 23 and 21. Downy Young No. 35.

SCIENTIFIC NAME

Histrionicus, Latin, relating to *histrion*, meaning a stage player; the bird being decked out in various colours as if to act on the stage.

COLLOQUIAL NAMES

IN LOCAL USE: Blue-streak; canard à collier (collared duck); canne de roche (rock duck); circus duck; lord and lady (these names generally used together, but sometimes separated to indicate the sexes, which are also called cock lord and lady lord); lord bird; mountain duck; painted duck; rock duck; sea-mouse; squealer; totem-pole duck (Western Harlequin); wood duck.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, dark slate blue, with purplish tinge; *crown*, black; *throat*, sooty black; white, triangular patch before eye tapers to streak over eye, turning to chestnut over eye and continuing to back of head where it meets its fellow; second white spot below and behind eye; third elongated white patch on side of neck; white collar around *lower neck*, incomplete in front and behind or showing vaguely in front; all white markings bordered narrowly with black; *bill*, bluish grey, much shorter than head; *nail* yellowish; small fleshy lobe on upper mandible at gape, overhanging lower mandible, not present in female or juvenile; *eye*, dark brown to reddish brown. *Body*, *Foreback* and *chest*, slaty blue; clear, black-bordered, white crescent in front of bend of wing; *hindback* and *scapulars*, slaty blue, latter with middle feathers white, bordered outwardly with black then slaty blue, forming white bar on shoulder which connects with broad white tertials; *rump*, steely blue black; *breast*, slaty brown; *belly*, slaty brown to dusky; *sides*, rich reddish brown; small white spot on *flank* at base of tail; *feet*, greyish blue to greyish brown, with dusky *webs*. *Tail*, long and pointed, slaty black; *upper* and *under coverts*, black. *Wings*. All *coverts*, dark slate, greater with purple gloss; two series of small white spots, one on *middle*, one on inner *greater coverts* in front of *speculum*; *primaries*, dusky, brownish on inner webs; *secondaries* with dark blue *speculum* with purple gloss; *tertials*, grey on inner webs, white on outer webs, margined with black; *lining* and *axillars*, dusky brown. (Note: Only fully matured birds achieve this distinctive plumage; under three years of age the markings are less clearly defined.)

ECLIPSE PLUMAGE: The moult into eclipse starts in June or July, when the plumage becomes uniform slate-grey, except for the wings, which retain the adult male pattern; the two white face-patches become less distinct and are mottled with brownish grey.

AUTUMN PLUMAGE: The adult male commences, in early autumn, a moult out of the eclipse plumage, in which it somewhat resembles the female, towards full winter plumage. The wing is as in winter plumage. In early stages some new black, and a few new chestnut feathers may be seen on the *crown*; new slaty-blue feathers appear on the *back* and *scapulars*, and often one or two white feathers in the middle of the *scapulars*. The first slight indications of the black-and-

white bar in front of the wing, may be noticed, and some reddish feathers of the winter plumage on the *sides*. Later in autumn, the white *head-markings* start to lose the grey-brown mottling of eclipse, and become more distinct; likewise *crown* and *neck-markings* become more noticeable; *chest* and *back* take on a more uniform slaty-blue appearance, with more white on *scapulars*; *rump*, mostly black; *sides*, reddish brown, with a few old, slaty-grey eclipse-feathers. The full winter plumage is usually attained in October.

ADULT FEMALE. *Head* and *neck*, dark olive brown, darker on *crown*; large white spot under eye and two smaller white spots, one in front of and above, and the other behind, eye; *chin* and *throat*, paler brown; *bill*, dusky, shorter than head; *eye*, brown. *Body.* *Back* and *scapulars*, dark olive brown; *rump*, glossy brownish black; *chest* and *sides*, paler brown, like throat; *breast*, greyish white, mottled with greyish brown; *belly*, greyish brown, mottled with greyish white; *feet*, as in male but duller. *Tail*, dark purplish brown; *upper* and *under coverts*, olive brown. *Wings.* All *coverts*, dark brown, washed with olive brown; *primaries*, *secondaries* and *tertials*, dark grey, washed with purplish; *lining* and *axillars*, dull brown.

JUVENILE. In first autumn plumage the sexes are alike and resemble the adult female, except *upperparts* somewhat paler, and *underparts* with more spotted appearance. Toward the end of November the young male begins to assume the plumage of the adult and by the end of January resembles the adult, except *wings* are still immature, the *underparts* are mottled, *rump* and *bill* are brown, and black-and-white bars on sides of *chest* are smaller. Further progress towards maturity is slow and not until second autumn, after the summer moult, do both sexes assume practically adult plumage. *Wing of Both Sexes.* As in adult female but *primaries* and *secondaries*, duller, paler, and without gloss; *tertials*, shorter and narrower.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A small, blue-backed duck, with many white markings and reddish sides. Chief distinguishing features (a) hind toe with lobe, (b) sides, rich reddish brown, (c) slaty-blue plumage, marked with many white spots and stripes, (d) small size.

The markings of this parti-coloured duck are unlike those of any other species. The Eastern and Western Harlequins, varieties of the same species, are separable as follows: male Harlequin Ducks from the Pacific differ from the Atlantic birds in having heavier bills and a slightly different coloration of the crown. In the Pacific bird the chestnut stripes on each side of the crown do not extend so far forward, and the colour is not nearly so rich, having a washed-out appearance. The transition from chestnut to white is also more gradual.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A small, brown, whitish-breasted duck. Chief features (a) hind toe with lobe, (b) two small and one large white spot on side of head, (c) entire upperparts, including wings, solid olive brown, with no white feathers, (d) breast, whitish, mottled with greyish brown.

The resemblance to the female Buffle-head and to the male and female Ruddy Duck in their winter plumage is superficial only.

FIELD MARKS

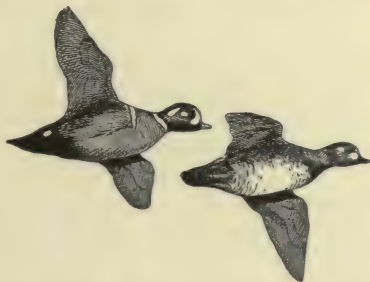
ON THE WATER. The male is readily identified by distinctive white markings on its slaty-blue body and head; the prominent white crescent in front of the wing is noticeable at a considerable distance; this duck can hardly be con-



fused with any other. The male, like the Ruddy Duck, sometimes cocks its tail. The female, at rest on the water, with its brownish back and white spots on the face, may be mistaken for the females of Buffle-head, Old-squaw and Surf Scoter.

It is larger than the Buffle-head and has three white face spots instead of one; the whiter head and neck, and paler upperparts of the Old-squaw will separate it; it is almost an exact replica of the female Surf Scoter, which, however, is very much larger. Harlequins sit high and buoyantly on the water and dive like a flash, often from the wing. Their movements on the water or land are quick, skillful and graceful. When seen standing on a rock, as they often are, they appear small-bodied and long-legged.

IN FLIGHT. The dark coloration of the male, relieved by irregular white lines and its red sides, will identify it. The dark female shows a whitish breast in flight, the three white face-spots are sometimes discernible, and there is no white in the wings. The flight is usually in compact flocks close to the water and with rapid wing-beats. The flight is very swift and is usually marked by abrupt turnings. The female Buffle-head shows a white speculum; the chunky female Old-squaw, which also has solidly brown wings, shows a large amount of white on breast, sides and head; the outline of the much larger, heavy-billed darker-breasted female Surf Scoter will prevent confusion.



VOICE. A squeak, like that of a mouse (hence the name sea-mouse). The male has a hoarse, *hu* or *heh-heh* and an *oy-oy-oy-oy* uttered on the wing, and a loud, clear *qua qua qua*. The usual cry of the female is *ek-ek-ek-ek*. Both sexes, when paired, utter a sound resembling *gi-ah*.

LIFE STORY

Called "lords and ladies" of the waters, Harlequins, the loveliest of sea ducks, reserve their elegant beauty for the isolated ledges and wave-washed rocks of northern coasts, and the dashing streams of rocky and mountainous regions. The adult male is attractively and fantastically decorated with bizarre spots and patches and, in the opinion of many, the only American wild fowl to excel it in beauty is the Wood Duck. It was named "Harlequin" because its gaudy parti-coloured plumage is reminiscent of the bright dress worn by the fictional character Harlequin, that likeable buffoon, the lover of Columbine. Though abundant in Iceland, this variety is comparatively rare on this continent but on the Pacific coast, another subspecies, the Western Harlequin, which differs from the Atlantic bird only in minor details of colour, is found in relatively large numbers.

"Their movements, both on land and water, are quick, skillful, and graceful; they run swiftly on dry land, and their gait reminds one very

little of the waddling of other ducks, but in walking the small head with its beautiful beak is stretched rather forward, and the long tail pointing downward, with the proportionately slender body and the peculiar coloring, all give this bird a rather foreign appearance, though certainly not an unlovely one. The plumage of this small duck charmed me particularly when I saw it swimming upstream with unparalleled swiftness through the frothing foam . . . winding about through the eddies of the strongest breakers, and making use of the quieter places in the most skillful way" (Millais, 1913). With regard to their flight, the same writer says: "The beautiful markings of the male of this species are only noticeable when the observer is close at hand, so that they are not the easiest duck to identify except when in flight. The flight, at first somewhat laborious, is very rapid. The short, pointed wings are beaten swiftly . . . when passing up or down stream it zigzags and turns, to accommodate its line to every bend of the stream, however slight. The Harlequin never thinks of cutting off corners, and it would seem that it imagines its life depends on keeping exactly over the water, however much it bends or twists. I have seen Harlequins fly religiously above a bend in a stream that formed almost a complete circle in its course, and yet the birds did not cut across it to shorten their route."

"If a shot is fired at a flock on the wing they will sometimes plunge from the air into the water and after swimming below the surface again take wing, coming up a hundred yards away—seeming, the instant they reappear, to dash from the depths into the air at full speed, leaving the gunner inexperienced in their ways, and who perhaps had thought that by some miraculous chance he had killed the entire flock, to find that he doesn't care for that kind of duck after all. I passed through just such an experience once, and remember yet how disgusted and surprised I was when after steaming up to where the whole flock should have been dead—no duck—and what may have been their ghosts rising from their watery graves 60 yards away" (Rich, 1907). The species is not now regularly sought by gunners and the flesh is reputedly of poor quality.

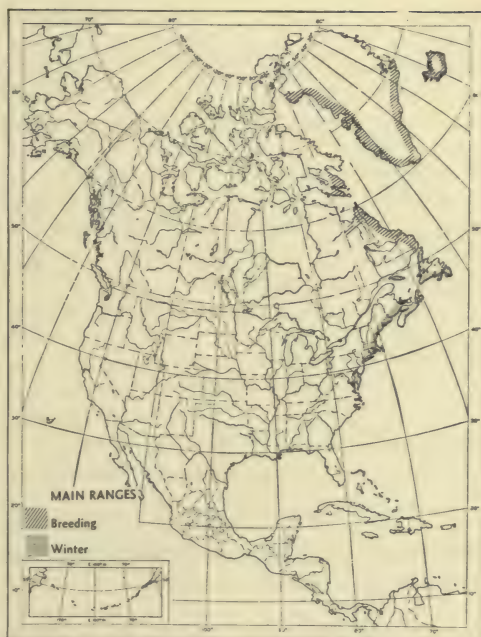
On this continent the main breeding grounds of this Harlequin are in Newfoundland and on the Labrador Peninsula; there they build their nests in the vicinity of the most boisterous mountain streams not far from the coasts. The nest is a hollow in the ground under shrubs or bushes, and is scantily lined with grasses and down. The number of eggs varies from 5 to 10 but the usual clutch is 6 or 7; they are light buff or cream colour and average 2.26 by 1.63 inches in size. The incubation period is about three and one-half weeks and is performed by the female alone, while the males gather by themselves on the coasts, moulting into the eclipse during July and August. Millais (1913) remarks on a characteristic of the species which is not found in any other of the ducks. He says: "It is presumed that the young are at first fed by the old bird direct from the bill, as newly hatched young always hold their bills upward to the beak of the foster parent, and will not at first pick up food for themselves." O. J. Murie in notes quoted by Bent (1925) says that the

Harlequins acquire their love for rough water early, for the young are brought up among the rapids of northern rivers, and he tells how on one occasion, when he was attempting to photograph a brood of ducklings, they became alarmed and were caught by the current and carried over a falls. Fearing they were lost he looked over in time to see them rising to the surface and floating along, preening themselves, none the worse for the accident.

A full description of the diving and swimming habits of the species is given in the "Life Story" of the Western Harlequin Duck.

The Harlequin Duck subsists almost entirely on animal matter. Less than 2 per cent of its food is of plant origin, and that consists entirely of unidentifiable drift or ground-up debris. The analysis of the stomach contents of 64 of these ducks, taken in January, February, March, June, July, August and September, gave the following approximate percentages: Crustaceans, 57; molluscs (including coat-of-mail shells, 9), 25; insects, 10; sea urchins, 2.5; fishes, 2.5; miscellaneous animal food, 1.5; total animal food, 98.5 per cent. Gravel averaged 19 per cent of the total stomach content. Most of the specimens analyzed were of the Pacific Harlequin race, but as those of the Atlantic variety examined were not noticeably different, all were included in the same report. Chitinous, or coat-of-mail shells, which are rarely taken by other ducks, formed about 9 per cent of the food of the Harlequin. These shells are found securely attached by suction to rocky coastal surfaces and even experienced collectors find great difficulty in detaching them; how the Harlequin does so is a matter of no small wonder.

In the spring the Harlequins start moving northward in February and by March and April are on their summer breeding grounds in northern Labrador and Newfoundland. The autumn migration usually takes place in November, and the winter is spent mainly off the outlying rocky islands and ledges of the eastern Canadian Provinces; they seldom remain south of the coast of Maine.



Western Harlequin Duck*Histrionicus histrionicus pacificus*

(his-tri-ón-i-kus, pa-sif-i-kus)

Colour Plates Nos. 23 and 21. Downy Young No. 35.

SCIENTIFIC NAME

Histrionicus, Latin, relating to *histrion*, meaning a stage player; the bird being decked out in various colours as if to act on the stage; *pacificus*, Latinized form, meaning of the Pacific Ocean.

COLLOQUIAL NAMES

(Included under Eastern Harlequin Duck.)

DESCRIPTION

ADULTS, BOTH SEXES. WINTER PLUMAGE: Identical with Eastern Harlequin except for certain minor details of colour and bill. See "Specimen Identification" under Eastern Harlequin Duck.

ECLIPSE AND AUTUMN PLUMAGE: Same as those of Eastern Harlequin Duck.

JUVENILE. Same as juvenile Eastern Harlequin.

SPECIMEN IDENTIFICATION AND FIELD MARKS

See Eastern Harlequin Duck.

LIFE STORY

The Western Harlequin Duck, except for certain minor differences of colour, is identical with the Eastern subspecies. From Alaska to the coast of central California, the Harlequin is found in comparative abundance, frequenting the rocky shores and revelling in the rough, tempestuous waters and the tumult of breakers on the exposed surf-washed beaches. These ducks may be seen climbing nimbly over the jagged, slippery rocks and ledges with the same ease and facility with which they ride the foaming crests of the sea. There is no weather too rough nor habitat too wild for these truly maritime little birds.

Of the diving ability of these ducks, Michael (1922) says: "Harlequins are expert swimmers and divers. They dive and swim under water with all the ease of a grebe, besides possessing the ability of the water ouzel to walk about on the river bed against the swift currents. When feeding, so far as we were able to observe, they show no preference as to depth of water. When working upstream along the shore they wade in the shallow water, prying among the stones. Where the water is deeper they tip up in the manner of mallard ducks, and where the water is still deeper they dive. They dive in water a foot deep and they dive in water 6 feet deep, always going down where there is a gravelly bottom. Most often they stay under water not more than 15 seconds. Often they stay down 20 seconds, and occasionally they remain under the water as long as 25 seconds. To leave the surface of the water they use their wiry tails as a spring to make the plunge and as they go down both wings and feet

are used as a medium of propulsion. When once on the gravelly bottom the wings are closed, the head is held low, and the progress is made against the current, as they walk along poking amongst the stones. When coming to the surface they float up like bubbles, without movement of wings or feet. Their bills break the water and their bodies pop suddenly onto the surface where they rest a moment. While poising on the surface between plunges their bodies float high. When earnestly feeding, seldom more than 10 seconds elapse between plunges. The birds seldom dive simultaneously. The female usually acts first. At times the harlequins choose the swiftest riffles, and when feeding there their method is the same as when in the less joyous waters. They apparently dive from any position with equal ease, but always as they go down they turn upstream, and even in the swiftest currents they come up in about the same spot at which they went down. When feeding in these racing waters they merely hesitate on the surface, and four or five dives are made in rapid succession. Such work as this is strenuous, but the birds are quite at home in the swiftest currents, and when tired from their exertions they swing into an eddy behind some snag or boulder and rest as they bob about on the surface."

"As a game bird the Harlequin Duck is of little importance. It is a comparatively rare bird, or entirely unknown, in most of the regions frequented by gunners; and even where it is fairly common its haunts are rather inaccessible. More-

over, it lives so largely on animal food that its flesh is not particularly palatable. Among the natives of the Aleutian Islands and other parts of Alaska, however, large numbers are killed for food" (Bent, 1925). The method employed some forty years ago by the natives of the Aleutian Islands to hunt these ducks is described by Bretherton (1896) as follows: "When first the writer went to Kodiak he tried hunting with a boat, relying on wing shooting to get his birds, but without much success; and seeing that the natives always got more birds, he changed his plan and took to the natives' method, as follows: When a band of



ducks was seen feeding, a landing was made and the beach approached from the land, the hunter being careful not to be seen. By watching the flock it would be seen that they all dived about the same time, and the time they remained down was about the same length each time. When the last duck dives, the hunter runs toward them, dropping in the grass or behind a rock about the time he calculates the first duck should be coming up again. In this manner he can approach close to the flock, that nearly always feed in the shallow water along the shore. When the last run is made, the hunter, if an old hand, stands on the edge of the water, the gun at 'ready,' and a couple of extra shells in the hollow of his right hand, the flock all being down. The first duck that comes up gets it, and the second one gets the second barrel, and in this way, by sharp practice, it is often possible to bag six or seven out of one flock."

The same writer says that in courtship, "the actions of these birds may justly be said to resemble the crowing of a rooster. In giving forth their call the head is thrown far back with the bill pointed directly upward and widely open; then with a jerk the head is thrown forward and downward as the cry is uttered, and at the same time the wings are slightly expanded and drooped. Afterwards they will rise in the water and flap their wings." They bob and bow to one another, swirl around, touch their bills together and utter little chatty sounds.

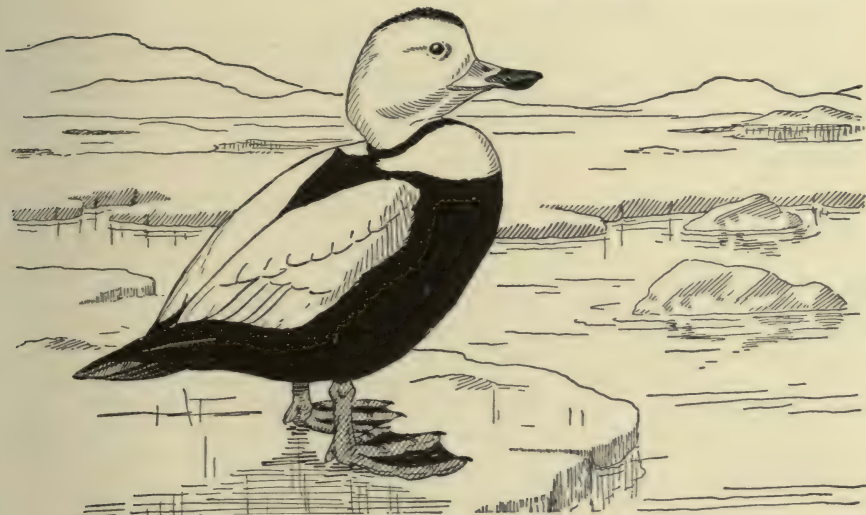
The nests of this species are built either on the ground or in holes in trees or cliffs, and the eggs are similar to those of the Eastern variety, averaging 2.30 by 1.62 inches. As soon as the eggs are laid the males desert the females and gather in flocks by themselves on the sea coasts where they moult into the eclipse plumage and become flightless for a while; flocks of these "flappers" are often mistaken for broods of young birds which have not yet learned to fly.

The migrations in spring and autumn are merely withdrawals from winter grounds to summer breeding places not far distant, or vice versa. The food and feeding habits of the species are described in the "Life Story" of the Eastern Harlequin Duck.

IN MEMORIAM

"Ye have robbed . . . ye have slaughtered and made an end,
Take your ill-got plunder, and bury the dead."

—SIR HENRY NEWBOLT.



Labrador Duck

Camptorhynchus labradorius

(kam-to-ríng-kus, lab-ra-dó-ri-us)

SCIENTIFIC NAME

Camptorhynchus, from Greek, *kamptos*, meaning flexible, and *rhynchus*, meaning beak, referring to the leathery expansion of the bill; *labradorius*, Latinized form, meaning of Labrador.

The Labrador Duck is now extinct. No natural agency can be blamed for the disappearance of this little duck, which was as well fitted to survive as any other species. The evidence all points to its destruction being accomplished by man. The wholesale slaughter of bird life which took place in the nineteenth century, coincident with the improvement in firearms, brought about the extermination of many species of birds, including the Labrador Duck. Never an abundant species, it was evidently unable to withstand constant persecution on its breeding grounds, where it was sought for the sake of its eggs, its feathers, and for its flesh. During the flightless period, when both young and adult birds were helpless, the annihilation of this beautiful little Sea Duck was not difficult to accomplish. The last Labrador Duck on record was shot on Long Island, New York, in the autumn of 1875. A specimen, since lost, is said to have been taken at Elmira, New York, in 1878. The species was supposed to have bred in a restricted range on the south coast of the Labrador Peninsula, and wintered on the Atlantic coast from Nova Scotia to New Jersey. Forty-four specimens in various museums throughout the world are all that remain to remind us of the Labrador Duck, and to warn us against a repetition of this disaster.

Steller's Eider

Polysticta stelleri
(pol-i-stick-ta, stél-e-ri)

Colour Plate No. 23. Downy Young No. 34.

SCIENTIFIC NAME

Polysticta, from Greek, *polys*, meaning many, much, and *sticta*, meaning spotted, varied; *stelleri* and the vernacular name "Steller's," in honour of George Wilhelm Steller (1709-1746), a German zoologist and traveller; naturalist on Bering's ill-fated voyage to the sea which bears his name.

COLLOQUIAL NAMES

Not known.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and side of *upper neck*, shiny white; tuft of peculiar plush-like feathers on back of head and a patch in front of eye, yellowish green or light olive green; two black spots flanking green tuft on back of head; black ring around eye; *chin* and *throat*, iridescent blue black, usually narrowly connected in front to blue-black collar around *middle neck*; *lower foreneck*, white; *bill*, dull greyish blue, lighter at tip; *eye*, dark brown to red brown. *Body. Back*, glossy blue black, centrally; sides of *foreback*, white; *rump*, black; *longer scapulars*, iridescent blue black, striped with white, *shorter scapulars*, white; black spot on sides in front of folded wing; *chest* and *sides*, cinnamon buff, deepening to orange brown on *breast*, centre of breast, sepia; *flanks* and *belly*, blackish; *feet*, dark blue grey, with dusky webs. *Tail*, long and pointed, dark brown; *upper* and *under coverts*, black. *Wings. All coverts*, white; *outer secondaries*, with blue-black *speculum*, tipped with white behind; *inner secondaries* and *tertials*, long and sickle-shaped, inner webs silvery white, outer webs blue black; *primaries*, brown; *lining*, mostly white; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse occurs in July and August, when the striking colours of the head and neck are replaced by brown feathers, with only a trace of the blue-black collar left on the hindneck. The *back* becomes dull black, and the showy *scapulars* become brown. The wings and *underparts* remain as they were and are moulted only once.

AUTUMN PLUMAGE: The moult out of the eclipse into full winter plumage follows much the same sequence as that described under the American Eider.

ADULT FEMALE. *Head* and *neck*, dusky brown and brownish buff, darkest on *crown* and *hindneck*, palest and most faintly variegated on cheek, at base of bill, around back of head and around eye (some do not show lighter colour on cheek, or at base of bill); *bill*, dusky blue; *eye*, dark brown. *Body. Back, scapulars, chest, sides* and *rump*, rich dark brown, with paler edges to feathers; *breast*, very dark brown, blackish on *belly*; *feet*, same as those of male. *Tail* and *upper* and *under coverts*, dark brown, upper coverts tipped with paler brown. *Wings. Lesser* and *middle coverts*, dusky brown, with greyish tips; *greater coverts*, dusky, with broad white tips; *secondaries*, with broad white tips and *speculum* as in male but duller; *inner secondaries* and *tertials*, sickle-shaped, dusky brown on inner webs, dark blue on outer webs, with pale grey-blue central streak on each feather; *primaries*, dark brown; *lining*, white; *axillars*, white.

JUVENILE. In the first autumn the sexes are alike and resemble the adult female except that they are lighter coloured, redder and more mottled *below*; the *back* and *scapulars* have buffy edgings to the feathers. The young male has *breast* and *sides* heavily barred with rich reddish brown. The young female has *underparts* barred with paler brown. During the first winter and spring the sexes differentiate but on the whole there is not much change until after the first eclipse moult in July and August, after which the plumage is fully adult. *Wing of Male.* As in adult female but *speculum*, duller blue and less extensive, most of the outer *secondaries*, dusky; white tips of *secondaries* and of *greater coverts*, narrower; pale blue central-streak on curved *tertials*, absent or only faintly indicated; *lesser* and *middle coverts*, with more extensive buffy-edgings. *Wing of Female.* As in juvenile male but blue of *speculum* entirely lacking, and replaced by dusky.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A medium-sized duck, strikingly marked with black and white on upperparts, and with chestnut-brown underparts. Chief distinguishing features (a) hind toe with lobe, (b) white head, with black throat and neck, and black ring around eye, (c) some scapulars, secondaries, and tertials greatly elongated, (d) white wing-coverts.

The male with its distinctive markings is difficult to confuse with any other duck.

AUTUMN AND JUVENILE PLUMAGE: See "Description."

FEMALE. General effect: A medium-sized duck of rich, dark-brown coloration. Chief distinguishing features (a) hind toe with lobe, (b) speculum, bordered in front and behind with white bars.

A small edition of the other female Eiders, but its more duck-like head and mallard-like speculum will distinguish it.



FIG. 50.—Bill of Steller's Eider.

FIELD MARKS

(To be looked for on the northwest Arctic coast, principally in Alaska.) Unlike the other eiders, which are heavily built, these are trim little ducks and are the smallest of the eiders. They are swift on the wing and, in flight, their long wings make a whistling sound similar to that of the Golden-eyes. The male, with its white head, black neck, white wings, and chestnut underparts, is readily identified. The female can be told by its rich, dark-brown colour and mallard like speculum.

LIFE STORY

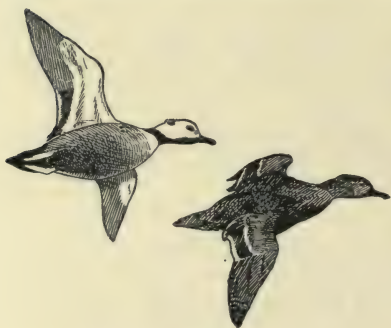
Steller's Eider is a trim little duck and exhibits none of the heavy, clumsy build and appearance of the other eiders. It is the smallest of the group and the male is a beautifully and oddly marked bird. Its habitat on this continent is off the Alaskan coasts, and in winter it seldom

wanders south of the Aleutian Islands; the centre of its greatest abundance is on the Arctic coast of Siberia, westward from the Bering Straits. It is a lover of cold weather and lives happily along the ice-bound shores of the arctic region, keeping well to sea except in the most boisterous weather. In winter large numbers of these ducks are killed by the natives of Alaska for food. This eider was discovered by Steller and first described in 1769, by the Russian naturalist, Pallas, who named it after its discoverer.



The nests are built on the moss of the flat tundra and consist of deep, round holes in the ground, well lined with down. During the incubation process the male remains in the vicinity, but he does not assist in the raising of the young. The female is a close sitter and leaves the nest unwillingly. From 6 to 10 eggs are laid; they are greenish to olive buff in colour and average 2.42 by 1.65 inches in size.

An analysis of the stomach contents of 66 of these eiders showed that of those birds taken during the months of May, June and July the diet was nearly nine-tenths animal food, and of those taken in the winter months the food was substantially 100 per cent from the animal kingdom. The approximate percentages of diet were as follows: crustaceans, 45; molluscs, 19; insects, 13; annelid worms, 3; sand dollars, 3; fishes, 2; miscellaneous animal food, 2; total animal food, 87 per cent. Pondweeds, 3; crowberry, 1; algae, 1; miscellaneous plant food, 8; total vegetable food, 13 per cent.



In the Hooper Bay region, Alaska, in 1924, Conover observed these birds. He says (1926): "This was the last of the eiders to make its appearance, although it became common before the Spectacled Eider arrived in any abundance. It was first seen on May 18, when about forty were observed in small flocks of from six to eight. The next day about the same number was seen, and after

that it became common. Their flight is very much swifter than that of the other eiders, and if a flock is shot into, the birds twist and turn like Scaups; in fact, except for the coloration of the drake, their appearance is very unlike eiders. By May 23, a few were flying about the ponds in the tundra and by May 27, they had become common. One flock which was watched was seen to be feeding on some variety of water grass, tipping up for it in the shallow water like Mallards. These ducks by now had become very tame.

"This was the only species of eider of which the immatures were seen in any numbers. On June 4, two immature drakes were noticed on

a pond with two pairs of mated adults. They were watched through field glasses and it was noticed that the adult drakes were very jealous of the youngsters, driving them off whenever they approached the females. The young drakes were not seen to take any interest in the females, however. No more immatures were noticed until July 1, when three females were shot. After that both ducks and drakes were seen occasionally about the tundra. The young females appear quite different from the adults, being slightly lighter colored and lacking the blue speculum. Two drakes, shot on June 4, differ quite widely in the amount of adult plumage they possess. One is in the brown plumage except for a mottling of white on the upper breast. The other has the head greyish, a tuft of slightly greenish feathers on the back of the head, and bright, metallic blue scapulars. Whether this difference is due to age or individual variation is hard to say. On July 3, an adult drake was collected which had started to moult into the eclipse plumage. It had not as yet commenced to change the body feathers, but the head and neck were more than half moulted. After about July 10, very few drakes were seen about the tundra.

"Very few were found nesting about Point Dall, but, like the Spectacled Eiders, they bred commonly on the flats of Igiak Bay. Generally, the nest was placed on or near the edge of a pond. The females were very tame. One driven from her eggs which were about to hatch stayed within ten feet, clucking and fussing about while photographs were being taken. The first eggs were found on June 19, and downy young were seen July 8."



Northern Eider

Somateria mollissima borealis
(so-ma-té-re-a, mo-lís-i-ma, bo-re-áy-lia)

Colour Plate No. 24.

SCIENTIFIC NAME

Somateria, from Greek, *somatos*, meaning the body, and *erion*, meaning wool, down (referring to the down of the body); *mollissima*, Latin, meaning very soft, referring to the softness of the down; *borealis*, Latin, meaning northern.

COLLOQUIAL NAMES

Same as those of American Eider.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: Identical with American Eider except (a) sea-green of hindhead does not extend as far forward under black cap, towards bill, (b) membranous processes on sides of bill, much narrower, terminating posteriorly in sharp points instead of in broad rounded ones, (c) feathered portions on sides of upper mandible do not extend as far towards nostrils as do those of American Eider (fig. 51), (d) often found with black V on throat present in Pacific and King Eiders.

ECLIPSE PLUMAGE: The moult into the eclipse takes place in July and August and the moult out of eclipse during November and December. Plumage changes are the same as those described under the American Eider.

ADULT FEMALE. Identical with female American Eider except for difference in bill-processes, as mentioned above under "Adult Male."

JUVENILE. The immature plumage and the sequence of moults are similar to those of the American Eider, which are described under that subspecies.

SPECIMEN IDENTIFICATION

See American Eider.

FIELD MARKS

(To be looked for on the northeast Arctic coasts, and, in winter, south along the Atlantic coast to Northern New England.) Field Marks are the same as those of the American Eider.

VOICE. Male, a hoarse grating sound, *kor-er-kor*, *kor-kor*. Female, a higher note, *kar-er-kar*, *kar-kaa*. Courtship voice of male, a soft cooing, almost dove-like sound, *pa-whoo*, or *aa-u*, or *oo-oo*.

LIFE STORY

The Northern Eider differs but little from its fellow subspecies, the American Eider. Though it associates on both its summer and its winter grounds with the American variety, its range on the whole is more northerly and extends across the arctic regions overlapping somewhere in the Arctic Archipelago that of the Pacific Eider. Provided open water

can be found, there is no natural cold which these ducks cannot endure; they are known to live in temperatures of 50 degrees below zero in places where the water is kept open by the rapidity of the current or tide rip. (While such temperatures seem exceedingly low, it must be remembered that no matter how cold the air, unfrozen salt water cannot be colder than about 28 degrees above zero.)

The Northern and the American Eiders belong to the same species as the Common Eider Duck of Europe, which produces most of the eider-down of commerce. In 1939 the Canadian Government granted the necessary authorization to the Hudson's Bay Company to begin the commercial production of eider-down in southern Baffin Island. It is probable that the Northern Eider is the variety from which most of this down will be collected. The eider-down industry on the southern coast of the Labrador Peninsula is dealt with in the "Life Story" of the American Eider.

The habits and behaviour, nests and eggs of this race are very similar to those of the American Eider Duck and are fully described in connection with that bird.



American Eider

Somateria mollissima dresseri
(so-ma-té-ri-a, mo-lis-i-ma, dréss-e-ri)

Colour Plates Nos. 24 and 29. Downy Young No. 34.

SCIENTIFIC NAME

Somateria, from Greek, *somatos*, meaning the body, and *erion*, meaning wool, down (referring to the down of the body); *mollissima*, Latin, meaning very soft, referring to the softness of the down; *dresseri*, in honour of Henry E. Dresser (1838-1915), celebrated English ornithologist, who published "Birds of Europe" in 9 volumes, 1871-81.

COLLOQUIAL NAMES

IN GENERAL USE: Sea-duck, very often sea-ducks and drakes, sometimes shortened to ducks and drakes. IN LOCAL USE: Big sea-duck; canvasback; black-and-white coot; Eskimo duck; Isle-of-shoals duck; laying duck; looby; metik (Eskimo name); moyac; moyak; passing birds; pied wamp; sea-coot; shoal duck; shoreyer; squam duck; squaw duck; wamp.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head.* Forehead, region around eye and crown, iridescent glossy black, crown divided along middle by white streak originating in hindhead; *cheek, chin, throat* and *neck*, white; *hindhead*, sea green, this colour extending forward narrowly under black cap almost to bill (in the Northern Eider this line of colour does not extend as far forward); narrow, indistinct line of white down side of head; *eye*, brown; *bill*, variable, from grey to green, in spring, orange yellow; *nail*, almost white, fused with bill and forming entire tip of upper mandible; *bill-processes* (fig. 51), from each side of base of bill a leathery process extends well up into forehead and terminates in broad, rounded tip (those of Northern Eider, much narrower, end in sharp, pointed tips), these processes divided by thin line of feathering on culmen; feathering of head, at lores, extends forward on upper mandible to below hind end of nostril, and is sharp-pointed terminally (similar feathering on bill of Northern Eider does not extend as far towards nostril). *Body.* Back and *scapulars*, white to creamy white; *chest*, white, tinged with pale creamy brown; *rump*, black, with white patches on *flanks*; *breast, belly* and *sides*, black; *feet*, yellow or green, *webs* dusky. *Tail* and its *coverts*, black. *Wings.* Lesser and *middle coverts*, white, dusky along forward edge of wing; *greater coverts*, black, in some cases with white tips, or occasionally with central feathers white or mottled white and greyish; *primaries*, black; *outer secondaries*, black; *inner secondaries*, white, and sickle-shaped; *tertials*, white; *lining*, grey and white; *axillars*, white.

ECLIPSE PLUMAGE: The moult into the eclipse

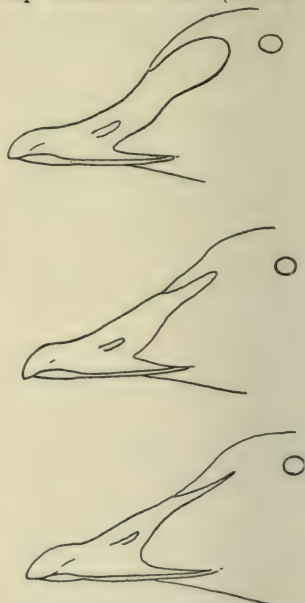


FIG. 51.—Bill-processes of the Eiders. Top, American Eider. Middle, Northern Eider. Bottom, Pacific Eider.

plumage commences in late June and reaches its climax in late July or August. In this plumage the bright colours of *head* and *neck* are replaced by blacks and browns, feathers of the *back* are greyish, tipped with dusky, and the *chest* becomes barred with black and brown. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: In early autumn the adult male commences a moult out of the eclipse plumage, described above, into full winter plumage. In early stages, a scattering of new, white feathers may be seen on *head*, *neck*, *back*, and *scapulars*; the *chest* also shows a few white feathers of winter plumage among brown-and-black barred ones of the eclipse. Later, the black-and-white *head* pattern of the winter plumage becomes recognizable, and a few sea-green feathers appear on the *hindhead*, though they are still mixed with a number of old brownish eclipse-feathers; the *back*, *scapulars* and *chest* are mostly white, with a few, old brown feathers. The moult usually continues till late December, when full winter plumage has been attained. Throughout this moult the full-plumaged wing distinguishes the fully adult male from younger males.

ADULT FEMALE. *Head* and *neck*, brown, finely streaked with black, darker on *crown*; *bill*, duller and greener than that of male in winter; *nail*, bone yellow; *bill-processes*, same as those of male but narrower posteriorly; *eye*, dark brown. *Body.* *Back* and *scapular* feathers, brownish black, broadly tipped, barred and mottled with rusty brown and buff; *chest* and *sides*, feathers brownish buff, barred with blackish and tipped with greyish buff; *breast* and *belly*, dusky brown; *feet*, greyish yellow, *webs* dusky. *Tail*, greyish brown; *upper* and *under coverts*, like the back. *Wings.* *Lesser* and *middle coverts*, like the back; *greater coverts*, greyish brown, tipped with white; *primaries*, brownish black; *outer secondaries*, brownish black, tipped with white; *inner secondaries* and *tertiaries*, rusty brown on outer web, brownish black on inner web; *lining*, brownish grey and white; *axillars*, whitish.

JUVENILE. In the first autumn the sexes are much alike but do not, as is the case with most ducks, resemble the adult female. The *plumage* is dull brown, with narrow sandy-brown edges to the feathers. The young male has a larger eye-stripe, darker *upperparts* and paler *chest* than the young female. During late autumn the young male differentiates by acquiring some black feathers in *sides* and *scapulars*, and some white feathers in *chest*. This moult continues during the winter, and by April many young males have the *throat*, *neck* and *chest* almost wholly white; the sea-green patch around the ear region is either completely developed or mixed with black and brown feathers; the *wing* and *underparts* are still immature.

During July and August of the second summer the first eclipse moult takes place. This is a complete double body-moult, and the first winter plumage is replaced by another which is similar but darker. During the second autumn a moult towards adult plumage continues and usually by November the plumage resembles that of the adult, but the young male can be recognized by certain imperfections: the *crown* is mottled with greyish brown; the white *back* shows a sprinkling of dusky feathers; the *breast*, black in the adult, is dull brownish-black, mottled and broken where it meets the white of the *forebreast* and *chest*. This plumage is worn until the second eclipse moult takes place; further progress towards full dress is made, and, after the third eclipse moult the plumage is fully adult, though there may be considerable individual variation as to this period.

The young female retains the immature plumage during the first winter, but by March most of the birds have acquired a semi-adult plumage but can be

distinguished from the adult by the immature *wing* and the *breast*-plumage. After the first summer moult the second winter plumage is assumed, which is almost adult, but the young birds are more heavily barred *above*, and the *breast* is more mottled but lighter than in the adult. After the second summer moult, when a little over two years old, the fully adult plumage is assumed.

The sequence of moults of young Northern and Pacific Eiders is similar to that of the American Eider. In the immature plumages the bill-processes described above will distinguish the American Eider. *Wing of Male*. (1st autumn) As in adult female but *secondaries*, greyer, and white tips absent; white tips to *greater coverts*, absent or poorly defined; *tertials*, dusky, narrowly edged with buff. (2nd autumn) *Wing coverts*, brownish; inner *secondaries* and *tertials*, white, edged with dusky (pure white in adult male). *Wing of Female*. (1st autumn) As in juvenile male but *tertials*, shorter than in adult female and less sickle-shaped. (2nd autumn) *Wing*, still immature.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very large duck, with creamy-white upperparts and chest, and black breast and sides. Chief distinguishing features (a) hind toe with lobe, (b) bill-processes (fig. 51), see "Description," (c) very large size.

The male can be confused only with the Northern Eider of the Pacific Eider; from the former it is told by the bill-processes described above; and from the latter by the bill-processes and by its lack of the V-shaped black chevron on the throat. The King Eider has the black V on the throat (as does also the Northern Eider, occasionally) and its bill-processes are entirely different. No confusion should arise in separation from the distinctive Stellar's, King or Spectacled Eiders, or any other duck.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very large duck of heavily-barred, rich-brown coloration. Chief features (a) hind toe with lobe, (b) bill processes (fig. 51), see "Description."

All female eiders are markedly alike in coloration, being rich-brown, heavily-barred ducks. The three that are most alike are the American, Northern, and Pacific Eiders; the bill-processes and feathering on the bills, detailed above, are the most ready means of distinction between them. The female Steller's Eider is much smaller, and has a mallard-like speculum. The female King Eider has a blackish-brown speculum, bordered inwardly only, with white bars, and is redder in coloration than the other female eiders. The female Spectacled Eider shows a clearly discernible circle of finely-marked, pale-brown feathers around the eye.

FIELD MARKS

(To be looked for one on the North Atlantic coasts and in James Bay and Hudson Bay.) Next to the Pacific Eider, these are the largest ducks; they are heavy, clumsy-looking birds; not distinguishable, except in hand, from the Northern Eider, with which they intergrade.

ON THE WATER. By its large size, white back and foreparts and black sides, the male is readily recognized. When the bird is swimming, the neck is drawn in and the bill points downward; the tail cocks somewhat upward; and when the bird is startled, the neck is stretched up and is much elongated. The female may be recognized by its large size and rich-brown, heavily-barred coloration and by the shape of the head, the forehead, and culmen being practically

in one straight line, much as in the Canvas-back. This is particularly noticeable when the bird is in flight.

IN FLIGHT. The flight of the larger Eiders is characteristic and unlike that of any of the other ducks; they fly close to the water, sluggishly, with head low-hung, and with steady flapping of the wings. The male has a black breast and white back; this marking, together with its white head, neck, and chest, is distinctive among the ducks.



VOICE. Male, a raucous, moaning call, *he, ho, ha, ho, or a-o-wah-a-o-wah.*

Female, a quack somewhat like that of a Mallard, often in series, *wak-wak-wak-wak-wak*; when angry, as when attacked by a gull, a harsh raucous note, *wh-r-r-r-r-r*; when ready for mating, the note is, *aw, aw, aw.* Courtship voice of male, two distinct notes, *ah-oo,* and *k'doo,* both notes being soft and dove-like, but of great carrying power. The downy young have a clear, piping note, *peep, peep, peep, peep.*



LIFE STORY

The fine, handsome American Eider belongs to the species that produces the down which has made "eider" a household word throughout the civilized world. This large maritime duck is closely related to the Common Eider of Europe and to the Northern Eider of the north Arctic coasts of America. Though persecuted almost to the point of extinction on this continent, the eider is one of the best friends of man, and is entitled to the fullest protection of our game laws. Most of the real eider down of commerce comes from the European variety of this wonderful bird, and our eider has been ready and willing to serve us on this continent in the same manner. With characteristic New World shortsightedness in the treatment of our natural resources we have, for generations, thoughtlessly slaughtered this splendid bird which is capable of furnishing us with a product of great value. Ornithologists from the time of the great Audubon have pleaded for the preservation of the eider and at long last, largely through the Provisions of the Migratory Birds Treaty, the bird now receives adequate protection.

Apart from civilized man, eiders have many natural enemies; Arctic foxes, polar bears, skuas, falcons, sharks, seals, ravens, and black-backed and glaucous gulls all prey on these gentle, trusting birds, their downy young, and their eggs. The natives of the North depend upon the eider, particularly its eggs, for food, and use its skins for garments. Hayes (1867) gives the following account of the depredations of the glaucous gull on young eiders: "Near by was a low, isolated rock ledge, which we called Hans Island. The glaucous gulls, those cormorants of the Arctic seas, had made it their peculiar homestead; their progeny, already full

fledged and voracious, crowded the guano-whitened rocks; and the mothers, with long necks and gaping yellow bills, swooped above the peaceful shallows of the eiders, carrying off the young birds, seemingly just as their wants required. The gull would gobble up and swallow a young eider in less time than it takes me to describe the act. For a moment you would see the paddling feet of the poor little wretch protruding from the mouth; then came a distension of the neck as it descended into the stomach; a few moments more and the young gulls were feeding on the ejected morsel." Dresser (1871) says: "I know of an incident that occurred . . . when a raven (*Corvus corax*) struck down a sitting eider duck, and, fixing his powerful claws in her neck, tried to drag her off the nest. In this he would have succeeded; but the eider drake arrived home and attacked the raven, whereupon a fight ensued between these two, which ended in both rolling, fast in each other's clutches, down the hill into the lake, where, however, the raven got loose and flew off."

Some idea of the extent of the depredations upon the eggs of the eider by the Eskimos is given by MacMillan (1918) who says: "How impatiently we awaited the discovery of those first golden nuggets in the nests. Can we ever forget those annual pilgrimages to the shrine at historic Littleton and Eider Duck Islands and McGarys Rock. Here, among a laughing, jolly company of men, women, and children, we pitched our tents among the nests; we boiled eggs, and we fried eggs, and we scrambled eggs, and we did everything to eggs. In a few hours 4,000 delicious fresh eggs were gathered from one small island alone. Cached beneath the rocks, away from the direct rays of the sun, they remain perfectly fresh; they become chilled in August; and freeze hard as so many rocks in September—a much appreciated delicacy during the long winter months. The shells are often broken and the contents poured or squirted from the mouth of the Esquimo into the intestinal sheath of the bearded seal or the walrus, a most nutritious sausage to be eaten on the long sledge trips."

Skins of the eider duck are used by the natives in the fashioning of clothes and blankets. Describing the blankets made by the Eskimos, Bent (1925) says: "They were made of the breasts of eiders from which the feathers had all been plucked, leaving the down on the skins, which had been cured so that they were very soft and pliable; the edges of the blankets were trimmed with the cured skins of the heads of many Northern and King Eiders, making very attractive borders. They were the softest, lightest, warmest, and most beautiful blankets I had ever seen, and I was told that they brought such fancy prices that they were beyond the reach of ordinary mortals. I believe the natives also use these plucked skins for winter underwear, wearing them with the down side next to the skin; eider-down underwear and Arctic-hare stockings must be very soft and warm."

The food of the American Eider, as is the case with all the eiders, is preponderantly from the animal kingdom. An analysis of the stomach contents of 96 of these birds, taken in the five months January, Febru-

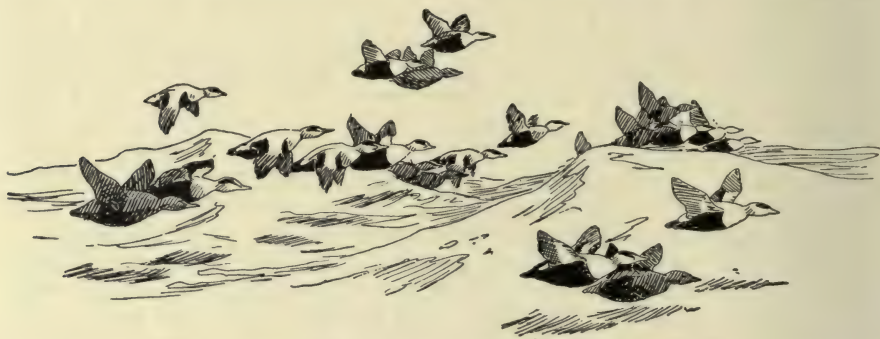
ary, July, November and December, from widely separated points along the coast from Rhode Island, Massachusetts, Maine, and Nova Scotia northward to Labrador and Hudson Bay gave the following approximate percentages: molluscs (including the blue mussel, 67), 82; crustaceans, 7; echinoderms (including sea urchins, 4.5), 5; insects, 2; total animal food, 96 per cent. The 4 per cent vegetable food consisted of drift and undetermined material. Had more of the stomachs come from summer months it is likely that the percentage of plant food would have been increased because in the stomachs of the July birds the plant food furnished 12 per cent of the diet; the crowberry, 2.44 per cent, represented the largest single item of plant food. Gravel represented about 14 per cent of the total stomach contents. The eider is an undesirable table bird as its flesh is of a high, fishy flavour.

The U. S. Biological Survey (now the Fish and Wildlife Service) conducted a number of investigations to determine the relationship of American Eiders to the shellfish industries and has concluded that only under exceptional circumstances do they cause any noticeable damage. Shellfishes of commercial value, mostly scallops, are occasionally taken but obviously are not sought out in preference to the common blue mussel that is so abundant along the North Atlantic coast, and that has no commercial value. The size and quantity of mussels consumed by these birds is surprising. Remains of 185 shells—an incredible number—were found in a single gullet and gizzard, and another well-filled gullet and gizzard contained larger shells, 36 whole mussels, and fragments of 22 others. The gullet of another bird contained 11 entire mussels ranging from $1\frac{1}{8}$ by $\frac{5}{8}$ inches to $1\frac{9}{16}$ by $\frac{3}{4}$ inches; and the stomach or gizzard of the same bird, 6 entire mussels from $\frac{7}{8}$ by $\frac{1}{2}$ inch to $1\frac{1}{2}$ by $\frac{3}{4}$ inches and remains of 7 more. Occasionally the tongue of a bird is caught between the valves of an open mussel, which usually results in the bird's death; the mussel tightly clamps the tongue, causing strangulation or starvation. Millais (1913) recounts that he once saw an eider duck flying "with something like a thick stick projecting 5 or 6 inches from its mouth, which it was unable to close. I shot the bird, an old



female, and found that the obstruction, when drawn out, was a razor shell (*Ensis siliqua*) 10 inches long and 3 inches in circumference. How any bird, even with the digestion of a sea duck, could assimilate so tough a morsel with a hard and thick shell seemed a marvel." All mollusc-feeding sea fowl have strong and powerful gizzards that mechanically and readily break the shells into small pieces upon which the chemical secretions more quickly operate. It is said that the grinding of the gizzard can sometimes be heard if the observer places his ear near the body of a live duck that has recently fed upon these molluscs. By frequent deposition of excrements of finely ground mussel shells on favourite sleeping areas on the upland parts of coastal islands, eiders add to the available calcium in the soil to the betterment of the ranges of lime-requiring (*calcophilous*) plants.

The flight of the American Eider is identical with that of the Northern Eider, the flight of which Bent (1925) says "is apparently slow, heavy and labored, but in reality it is much stronger and swifter than it appears and exceedingly straight and direct. Its heavy head is held low, with the bill pointing somewhat downward, a characteristic and diagnostic attitude. Eiders usually fly in small flocks, in Indian file [or abreast], close to the water, often following the indentations of the shore line, but very seldom flying over the land. In rough weather a flock of eiders is apt to follow the trough of the sea and is often lost to



sight between the waves. I have seen one, when shot at and perhaps wounded, dive out of the air into the water and not show itself again. It is an expert at diving and hiding below the surface; if there is only the slightest ripple on the water it can conceal itself and swim away with only a portion of its bill protruding and almost invisible. As stated above, eiders are capable of diving to depths of 8 or 10 fathoms if necessary. In diving, the wings are partially opened and used to a limited extent in swimming under water, but the wings are not wholly spread; progress seems to be made mainly by the use of the feet."

The courtship of the American Eider can be observed during the latter part of May and in June along the southern coast of the Labrador Peninsula. It is described by Townsend as follows: "The actual courtship of the eider may be recognized from afar by the love note of the

male, which can be expressed by the syllables *aah-ou*, or *ah-ee-ou*, frequently repeated, and, while low and pleasing in tone, its volume is so great that it can be heard at a considerable distance over the water. On a calm day when there were many eiders about, the sound was almost constant. While the syllables *aah-ou* express very well the usual notes, there is much variation in tone, from a low and gentle pleading to a loud and confident assertion. In fact, the tones vary much as do those of the human voice, and there is a very human quality in them, so much so that when alone on some solitary isle I was not infrequently startled with the idea that there were men near at hand.

"But the showy drake eider does not depend on his voice alone; he displays his charms of dress to best advantage and indulges in well-worn antics. It always seemed to me a pity that the magnificent black belly should disappear when the drake is swimming on the water, and the bird evidently shares my sentiment, for during courtship he frequently displays this black shield by rising up in front, so that at times in his eagerness he almost stands upon his tail. To further relieve his feelings he throws back his head and occasionally flaps his wings. The movements of the head and neck are an important part of the courtship, and although there is considerable variation in the order and extent of the performance, a complete antic is somewhat as follows: The head is drawn rigidly down, the bill resting against the breast; the head is then raised up until the bill points vertically upward, and at this time the bill may or may not be opened to emit the love notes. Directly after this the head is occasionally jerked backward a short distance, still rigidly, and then returned to its normal position. All this the drake does swimming near the duck, often facing her in his eagerness, while she floats about indifferently, or at times shows her interest and appreciation by facing him and throwing up her head a little in a gentle imitation of his forcefulness." Dr. H. F. Lewis in notes kindly furnished the author, says that the eider has two courtship notes: "When the head is drawn back over the scapulars and then brought quickly forward, the note *ah-oo* is uttered as the head is brought forward. When the head and bill are pressed down against the breast and suddenly elevated, the note *k'doo* is uttered as the head is elevated. I think *ah-oo* is the usual, preliminary courtship note; *k'doo*, on the other hand, is used when the male thinks that he perceives that the female is responding to his persistent courting."

Eiders prefer to nest in communities. The nests are placed on the ground, almost always on islands and generally close to salt water, though often nests are found a hundred yards or more from the water. The nesting site may be open to the sky in a depression among the rocks of a barren island, but it is often partially or wholly concealed among and under spruce, alder and laurel bushes or in the grass and rushes. The nest itself is made of seaweeds, mosses, sticks, leaves and grasses matted together, but is chiefly distinguished for the famous eider-down, which is plucked by the mother from her breast. The down is of a dull grey colour, very soft, warm, and usually supplied in such liberal

amounts that the eggs can be entirely covered when the sitting bird is absent. The female can supply some down for a second set of eggs if the first is stolen, or if the down is removed. The statement that the male is called upon to supply down for the nest is not correct. He does not supply down, but he often visits the nest while the set of eggs is incomplete. If the nest is repeatedly robbed of down the bird is obliged to use other material in its place. The eggs are oval in shape, of a lusterless exterior, as if the lime had been put on with a coarse brush. The colour is olive green, varying in depth, and sometimes tinged with brownish. Four eggs constitute the usual setting which, however, varies from 3 to 6 eggs, the average size of which is 2.99 by 2.00 inches. These are the largest of ducks' eggs. The period of incubation is 28 days and incubation is performed by the female alone.

The spring migration from New England coasts takes place during the latter part of March and the beginning of April. The adult males precede the females and juveniles. The females must overtake the males, for adults of both sexes arrive on the breeding grounds in mixed flocks of 20 to 100 birds each. Just before commencing their northward flight these birds may be seen gathering on the sandbars, as the gunners say "to take in sand ballast" after which they proceed north in long lines. The summer is spent on breeding grounds which lie chiefly on the islands off the coast of Labrador. In June fully half of the adult males leave the breeding grounds in flocks. The autumn migration takes place during November and by the middle of December the birds are on their winter quarters which extend from as far north as open water is to be found to the coast of Massachusetts. Winter holds no terrors for them; even in the roughest winter storms they brave the foaming waves, diving unconcernedly for their food among the surf-swept ledges.

As has already been mentioned, the American Eider belongs to the species from which the eider-down of commerce is obtained. In Norway and Iceland a thriving and substantial eider-down industry has flourished for a great many years, but on this continent we have been tardy in following the example set by these older countries. In Europe the eider duck has for long been rigidly protected and made a source of considerable revenue. In America, on the contrary, this valuable bird has been incessantly persecuted and by constant eggging and senseless slaughter was greatly reduced in numbers. Eider-down, as is well known, is not only extremely light and elastic but is one of the poorest conductors of heat and as such is an ideal substance for the making of coverlets, quilts and stuffed garments, in which the qualities of lightness and warmth are the chief requisites. Genuine eider-down brings a high price in the markets of the world.

Typifying the attitude of the European countries towards the eider and illustrating how the eider-down industry is fostered, Annandale (1905) says: "The one offense against the Icelandic bird laws which a native can not commit with impunity is the slaughter of the eider duck. What is more important than many laws, namely public opinion, protects the species, and there seems to be a sentimental interest in it.

Probably it is due to the tameness of the bird, which appears actually to seek the vicinity of a human dwelling for its nesting place and to frequent those parts of the coast which are more frequented by man. The Icelandic eider farms are frequently situated on little islands off the coast. Small circular or oblong erections of rough stones are made among the hummocks, to protect the brooding ducks from wind and driving rain. All the sea fowl in these farms become exceedingly tame, as no gun is allowed to be fired and everything liable to disturb the ducks is carefully banished. Those who know how to handle them can even stroke the backs of the ducks as they sit on their eggs."

In spite of the plea of naturalists throughout the years for the protection of the eider duck in America and for the establishment of an eider-down industry on this continent, it was not until 1933 that such an industry was started on a permanent basis.

Of this young industry Lewis (1938) says: "A small industry of this kind began its activities on the north shore of the Gulf of St. Lawrence, in the eastern part of the Province of Quebec, in 1933. It was made possible by a co-operative agreement between the Department of the Interior, Dominion of Canada, and the appropriate authorities of the Province of Quebec. Its principal object was improved conservation of the American Eider Duck."

The following extracts from Dr. Lewis' article on this industry are of particular interest: "Down is usually collected from each nest on at least two occasions, a few days apart, during the incubation period. A little of the down, preferably the dirtiest, is not taken away, but is quickly molded into a pad and placed in the bottom of the nest. The eggs are then carefully replaced on this pad. In some cases it has been found profitable to gather down from a nest three times. When the mother duck has no more down for her nest she covers the eggs with leaves or dead grass, which seem to meet her requirements satisfactorily. Practically no down is gathered after the eggs have hatched."

"The down is cleaned by a method developed in Iceland. This consists of warming and shaking the down on racks in the sun on two or three fine days, then heating it over a stove and rubbing it repeatedly and rather forcibly over a frame strung with taut parallel cords, then removing the few remaining bits of foreign material by hand."

"From thirty-five to forty nests are ordinarily necessary for the production of a pound of down. . . . Among the thousands of nests from which down has been removed during the incubation period there have been found less than a dozen in which the eggs subsequently failed to hatch. . . . It is safe to conclude that careful handling of the eggs and gathering of down in the manner described seldom, if ever, causes the incubating eider to desert her nest or prevents normal hatching of the young."

"In 1939 the Hudson Bay Company obtained from the Minister of Mines and Resources at Ottawa the necessary authorization to begin commercial production of eider-down from southern Baffin Island on a fairly large scale in 1940."

Pacific Eider

Somateria v-nigra

(*Somateria mollissima v-nigra*, of Peters)

(so-ma-té-ri-a, ní-gra; mo-lís-i-ma)

Colour Plate No. 24. Downy Young No. 34.

SCIENTIFIC NAME

Somateria, from Greek, *somatos*, meaning the body, and *erion*, meaning wool, down (referring to the down of the body); *nigra*, Latin, meaning black, referring to the black V-shaped chevron on the throat; *mollissima*, Latin, meaning very soft, referring to the down.

COLLOQUIAL NAMES

IN LOCAL USE: Canvasback; eider; eiderduck; large pistrik (pistrik is the Russian name for eider); sea duck.

DESCRIPTION

MALE. WINTER PLUMAGE: The largest of all North American ducks. Similar to American and Northern Eiders except for sharp, black V, point foremost, on white of throat (hence name *v-nigra*); eye, brown; bill, bright orange to orange red, with paler nail; feet, paler and more yellowish than in American and Northern Eiders.

Bill of both sexes: Membranous processes at base of bill, narrower and more sharp-pointed than in Northern Eider, much more so than in American Eider; they also extend more along top of forehead and less at sides. Feathered portions on sides of upper mandible tend to be rounded instead of pointed terminally, as in other species (fig. 51).

ECLIPSE AND AUTUMN PLUMAGE: See American Eider.

FEMALE. A very large duck. Similar in general coloration to female American and Northern Eiders and female King Eider but somewhat paler; eye, brown; bill, greenish yellow, with paler nail; feet, greyish yellow; webs dusky. From the two first it can be separated by bill-processes described above; from the last, by feathering on bill which extends much further towards nostril.

JUVENILE. See American Eider.



Head from below, showing black, V-shaped chevron.

SPECIMEN IDENTIFICATION

See American Eider.

FIELD MARKS

(To be looked for on the north Pacific and western Arctic coasts.) The field marks are the same as those of the American Eider.

LIFE STORY

The Pacific Eider is the largest of our ducks, both males and females averaging $5\frac{1}{2}$ pounds. In general appearance it is very similar to the American and Northern Eiders; the male has a black V-shaped chevron on the throat which is lacking in the American and most Northern Eiders, the bill-processes are slightly different and there is a pronounced difference in the colour of the bill. Apart from these variations the two species are practically identical. Proof of the common ancestry of these three eiders and the King Eider is evident from the close similarity of their markings. The ranges of the Pacific and Northern Eiders may overlap somewhere in the Arctic Archipelago and interbreeding between the two forms may occur.

Like the Northern and American Eiders, this species builds its nests in the vicinity of salt water. The nest is usually a depression in the ground plentifully lined with soft grey down; the eggs are similar to those of the other species and average 2.99 by 1.98 inches. The number of eggs is said to vary from 5 to 10, but it is probable that the larger number is unusual. Incubation is performed by the female alone; the males desert the females at this time and gather in flocks by themselves on the sea coast to moult into the eclipse plumage. Mr. Hersey in notes quoted by Bent (1925) recounts coming across a female with a brood of young on a small lagoon. In her endeavours to lead her brood to safety the mother duck was absolutely fearless. He stood on the bank and watched her for twenty minutes as "She splashed about in the water, making quite a commotion, all the while calling in a low guttural tone. Some of the young swam around her while others dove. . . . After considerable difficulty she got her brood around her and started to swim away, but the young did not follow and, after swimming some 12 or 15 feet and calling, she returned and the performance was repeated. Whether the actions of the young were due to panic or inability to realize the presence of danger I could not tell, but they appeared to me to be decidedly stupid. I know of no other duck, not excepting the Oldsquaw, which at times seems to be devoid of any sense of danger, that would not have led her young to safety in a fraction of the time it took this eider."

In the Hooper Bay region, Alaska, Conover found these ducks nesting; he says: "On May 28, the first nest was discovered, and on June 28, the first downy young were seen, a brood of six, a day or two old, found in a very small pond back in the low hills. At my approach the female flopped over the water despairingly, but when I fired at one of the young, she left the vicinity immediately. The downies could dive very well, and in half a minute no sign of life appeared on the surface of the pond. Walking carefully along the shore, a young bird was soon discovered flattened out in the grass at the water's edge. It made no effort to escape as I bent over, evidently thinking itself well hidden. Following around the entire shore line of the pond, the entire brood was soon captured. That the female of this species may not make a very devoted mother,

seems borne out by another instance. On June 29, Murie found a nest with three young and two eggs. When the nest was visited again June 30, the female had left with the three young already hatched, although the remaining two eggs were pipped and the young still alive in them.

. . . Of the three species of eider nesting in the vicinity, this bird was the rarest, although during the early migration it was the second in abundance of the four eiders, being outnumbered only by the King Eiders."

The food of the Pacific Eider is almost entirely animal. An analysis of the stomach contents of 61 taken in Alaska during the months of January, February, March, May, June and July, gave the following approximate percentages: molluscs (including the blue mussel, 12), 46; crustaceans, 31; echinoderms (including the sand dollar, 6), 14; fishes, 2; miscellaneous animal food, 3; total animal food, 96 per cent, Algae, 3; miscellaneous plant food, 1; total vegetable food, 4 per cent.



Those eiders that breed in the Aleutian Islands probably winter in the same locality. Those that breed on the Arctic coast of Alaska and as far north as the Diomedes, however, must make the 2,000 mile trip to the Aleutian Islands. They cannot winter north of the Bearing Straits, as there is no open water to be found in this part of the Arctic Ocean.

The habits and behaviour of the Pacific Eider are similar to those of the American Eider and are fully described under that species.

King Eider

Somateria spectabilis
(so-ma-té-ri-a, spek-tá-bi-lis)

Colour Plates Nos. 25 and 29. Downy Young No. 34.

SCIENTIFIC NAME

Somateria, from Greek, *somatos*, meaning the body, and *erion*, meaning wool, down (referring to the down of the body); *spectabilis*, Latin, meaning conspicuous, spectacular.

COLLOQUIAL NAMES

IN LOCAL USE: Canvasback; cousin; Isle-of-shoals duck; king-bird; mongrel drake; passing duck; pistrik (the Russian name for eider); sea duck; wamp's cousin; warnecootai.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head.* Crown and back of head, pearl grey; *cheeks*, pale sea green; *neck, throat* and *chin*, creamy white, with V-shaped forward-pointing black mark on throat and chin; *bill*, bright red orange; *nail*, brownish grey; *bill-processes* (fig. 52). on each side at base of bill a large, high, fleshy process extends into forehead, bright yellow, shading into bright red orange on forward part, and bordered with a narrow line of glossy black feathers; *eye*, dark brown; *eyelids*, bluish; spot below eye, black; usually a creamy-white line over eye extending to sides of upper neck. *Body.* *Foreback*, white; *chest*, creamy white, tinged creamy brown; *back, scapulars, rump, sides, breast* and *belly*, brownish black; large white patch on *flanks* at base of tail; *feet*, yellowish to dull orange, with dusky *webs*. *Tail* and its *coverts*, dull brownish black. *Wings.* Forward *lesser coverts*, dusky, rest of lesser and *middle coverts*, white; *greater coverts*, brownish black, outer ones narrowly tipped with white; *secondaries*, outer ones, brownish black, narrowly tipped with white; long *inner secondaries* and *tertials*, sickle-shaped, brownish black, darker on outer webs and somewhat glossed with purple; *primaries*, brownish black; *lining*, grey and pale brown; *axillars*, white.

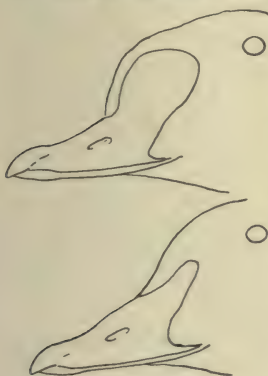


FIG. 52. — Bill-processes of King Eider. Above, male. Below, female.
(See also fig. 51)

male resembles the adult female. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: The moult out of the eclipse into full winter plumage follows much the same pattern as that described under the American Eider (which see); the wing is as in winter plumage; the full winter dress is usually attained late in November.

ADULT FEMALE. *Head and neck*, cinnamon buff, finely streaked with black, darkest on *crown*; *bill*, pale greenish grey or yellowish; the peculiar *bill-processes* present in male are poorly developed in female, but are quite different from those of other female eiders; *eye*, dark brown. *Body. Back and scapulars*, brownish black, feathers edged with tawny and buff; *rump, chest, and sides*, cinnamon buff, feathers with black U-shaped marks; *breast*, brown to blackish; *feet*, dull greenish grey to dull yellow; *webs*, dusky. *Tail*, dark brown; *coverts*, like rump. *Wings. Lesser and middle coverts*, like back; *greater coverts*, brown, inner ones with white tips; *primaries*, blackish brown; *secondaries*, with *speculum* of blackish brown, bordered inwardly, in front and behind, with white; long *inner secondaries*, sickle-shaped, blackish brown, edged with cinnamon; *tertials*, blackish brown, broadly edged on outer webs with cinnamon; *lining*, mottled with grey, pale brown and white; *axillars*, white, faintly mottled with brownish.

JUVENILE. During the first autumn and early winter the young male is dull brown with paler edges to the feathers; the *underparts* are dull mottled brown; the *bill* is flesh coloured. In the late winter and early spring the *back, scapulars* and *sides* become nearly black; the *crown* and *neck* become darker brown; a variable amount of white appears in the *chest*, each feather tipped with dusky; some white dusky-bordered feathers appear on the sides of the *rump*. Some birds show considerable white on the *neck* and *throat*, with a suggestion of the black V during the first spring. The *underparts* and *wings* show no change.

After the first eclipse moult, which takes place during the summer and has disappeared by November, the young male, which is now in its second winter plumage, is practically adult in appearance, but the *plumage* is somewhat duller. After the second eclipse, when about 28 months old, the young male acquires the fully adult plumage.

The plumage changes of the young female are similar to those of the American Eider. Young females are similar to adult females but the colours are duller, particularly on the *underparts*. The bill is greyish olive. *Wing of Male.* (1st autumn) As in adult female but *coverts*, dusky, with paler edges to feathers; white tips of *greater coverts* and *secondaries*, absent or only faintly indicated; *speculum*, duller and greyish; *tertials*, shorter and less curved. (2nd autumn) *Lesser and middle coverts*, white, margined, and shaded with dusky (pure white in adult male). *Wing of Female.* As in juvenile male, but *speculum*, paler; *tertials*, less curved than in young male or adult female.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very large duck, with creamy-white foreparts, black hindparts, and peculiar, high, yellow bill-process. Chief distinguishing features (a) hind toe with lobe, (b) bill-processes (fig. 52), see "Description."



This bird can be confused with no other duck.

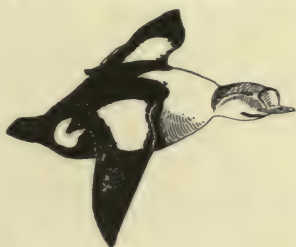
AUTUMN AND JUVENILE PLUMAGE: See "Description."

FEMALE. General effect: A very large, tawny-brown duck, heavily barred with brownish black. Chief features (a) hind toe with lobe, (b) bill-processes (fig. 52), see "Description," (c) white tipping to greater coverts and secondaries, on inner part of wing only.

This duck is very similar to the other female Eiders. For distinctions see "Specimen Identification" of female American Eider.

FIELD MARKS

(A circumpolar species, found wintering on the North Atlantic coast and sometimes found on the Great Lakes.) These are large, clumsy-looking ducks. The male has a *black* back as well as a black breast and, in flight, shows large white wing-patches (The Northern, American and Pacific Eiders also have black breasts but the backs are *white*). At a distance the foreparts of the male appear white, and the hindparts, black; this colour pattern is unique among the ducks. The pose on the water and the style of flight are similar to those of the American Eider. The female appears as a large, rich-brown, heavily-barred duck and cannot be separated, except in hand, from the other large, female eiders.



VOICE. Courtship voice of male, a loud rolling call in threes, increasing in volume on the last note, *urrr-urrr-URRR*. Also a soft cooing sound, usually at night.

LIFE STORY

The beautiful and showy King Eider inhabits the northern circumpolar regions of both hemispheres. Of all the eiders, however, it is the one that is most frequently found south of its natural habitat. It is often seen on the Great Lakes and on the eastern and western coasts of the United States and Canada. It nests in the remote subarctic regions and, in part, spends the winter as far north as it can find open water. Bent (1925) says that "in southern Greenland it associates with the Northern Eider in the open water in the fjords, but probably the greater number spend the winter at sea on the edges of the ice packs or in the open leads. On the western side of the continent the principal winter resort of this species is in the vicinity of the Aleutian Islands, where so many other sea ducks find congenial surroundings and abundant food. Some few birds winter as far north as the Diomed Islands, and many resort to the islands south of the Alaska Peninsula."



"No one who has not observed the migration of the King Eider along the Arctic coast of Alaska can realize the enormous abundance of this species in the north. . . . The birds travel mostly in large flocks of 75 to 350 birds, following the shore line but keeping at least a mile from land. They spread out in a long line, the birds flying nearly abreast, but in the larger flocks quite a few will be bunched toward the center, or sometimes two or three small parties of 10 to 20 birds will follow directly in back of the main line. There is an undulating motion to these flocks when seen at a distance similar to that of a flock of Canada Geese. They fly some 30 or 40 feet above the water or ice and follow in what appears to be the exact course of the flock that had passed a few moments before. During the 10 days that this migration was under observation

there appeared to be no diminution in the numbers of birds coming out of the north. . . . The migration moved on without interruption from daybreak, which at this time of the year [August] takes place between 3 and 4 in the morning, until the sun sets, about 9 p.m. The flight of one of these migrating flocks seems slow, probably on account of the wavy motion of the line of birds, but when they finally sweep past it is seen that they are really flying swiftly, and there is a roar of wings audible for a long distance." From notes by Mr. Hersey, quoted by Bent (1925).

On the southern coasts of New England and around Long Island the King Eider is an irregular winter visitor, but during some seasons it is quite common. Bent (1925) says: "To visit the winter haunts of the King Eider on the New England coasts, one must be prepared to brave the rigors of the cold, rough sea in the most exposed places; for these hardy birds do not come until wintry conditions have made offshore boating far from comfortable, and they prefer to frequent the outer ledges which at that season are almost always unapproachable. I can well remember a December morning on the coast of Maine, the first chance after a week of waiting for a day smooth enough to reach the outer islands, when we started long before daylight for a little eider duck shooting. Fifteen miles or more we had to go in our little launch to reach the ledges where we were to shoot. . . . As we approached Spirit Ledge, where we intended to do our shooting, all hope of landing was dispelled, for the waves were breaking over it with clouds of spray and all around it the submerged ledges were white with combing breakers. It was no place for us, this wild scene of ocean fury, but for the birds it held no terrors. There, just beyond our reach, were hundreds of American Eiders, Surf and White-winged Scoters, flocks of Old-squaws, and a few of the black-backed King Eiders. . . . It was a wild and attractive scene, but we could only view it from a distance, and we were finally obliged to retire to a more sheltered ledge where we succeeded in landing and setting out our decoys in the lee. . . . Off around the outer ledges we could still see the flocks of eiders feeding in the surf, riding at ease among the angry waves, paddling backwards or forwards to avoid the breaking crests, or diving under a combing breaker."

The courtship of the King Eider is described as follows by Brooks (1915). He was approaching a small lagoon when he heard a peculiar noise which came in a series of three, *urrr-urrr-URRR*. On arriving at the lagoon he saw a small flock of King Eiders, three females and five males. "They were on the beach, and three males were squatted in a triangle about a female, each about a yard from her. They did much neck stretching, as many male ducks do in the spring, and frequently bowed the head forward. The males constantly uttered the above drumming note. During this time the female was very indifferent to the attentions of her suitors, doing nothing more than occasionally extending her head toward one of them. After a brief period of these tactics, one or more of the males would enter the water and bathe vigorously, with much bowing of heads and stretching of necks, to return to the beach

in a few moments and repeat the foregoing performance. Finally they all took wing, uttering the croaking sound similar to the Pacific Eider."

Whereas the other eiders seem to prefer nesting on small islands along the sea coast, the King Eider nests on the mainland or on large islands, frequently near the shores or on islets in fresh-water ponds and streams. Its nests are usually widely scattered instead of being in colonies as those of the American and Northern Eiders often are. The nest itself is similar to that of the American Eider but the down is darker. From 4 to 7 eggs are laid; the usual number is 5. The eggs are smaller than those of the American species and the colour is in varying shades of olive buff. The average size is 2.66 by 1.76 inches. Incubation is performed by the female alone as the males desert the females at this time and gather in flocks by themselves on the sea, often far from land. Manniche (1910) records that like many other birds the female King Eider is irritable and quarrelsome at this time. One evening he observed a female which had just left her nest. She flew quickly straight toward him and so low that she seemed to touch the earth with the tips of her wings. Uttering an angry grunt she flew to a pond where she quenched her thirst and took a few quick dives to put her feathers in order, then she swam straight toward him, hissing and growling the while; the feathers on her head were erected, and she seemed to be very much displeased at his presence. Bent (1925) says that immature birds do not breed during their first spring, and perhaps not during their second. The young birds flock by themselves until they become of breeding age, which is probably during their third spring. "They do not go as far north in the summer, are never seen on or near the breeding grounds, and they usually winter farther south. Most of the straggling inland records are made by birds of this class."

The King Eider is supposed to feed in deeper water and to remain under longer than any other duck with the exception of the Old-squaw. One of these birds that was shot just after it came to the surface in 30 fathoms (180 feet) of water had freshly-swallowed molluscs in its gullet. Its food, like that of the other eiders, is almost entire-



ly animal. The stomach content analyses of 85 specimens collected during January, February, March, May, June and November, principally in Alaska, but also in three States, two Canadian Provinces, and Siberia, revealed the following approximate percentages: molluscs (including blue mussel, 20), 46; crustaceans (including king crab, 9), 19; echinoderms (including sand dollar, 8, and sea urchin, 6), 17; insects, 5; sea anemone, 2; miscellaneous animal food, 6; total animal food, 95 per cent. Eelgrass, 2; algae, 2; miscellaneous plant food, 1 total vegetable food, 5 per cent. Approximately three-fifths of the birds had fed exclusively on animal food. Gravel represented about 24 per cent of the total stomach content, but the gizzards being only partly filled accounted for this percentage being higher than was the case of the other eiders or the scoters.

"The flight of the King Eider is similar to that of the other eiders, but the male can be easily recognized, even at a long distance, by the larger amount of black in the back and wings. The adults are usually very shy, but the immature birds are very often unsuspicious. As this species has to fly inland to its breeding places, it has less fear of the land than the common eider and does not object to flying over points of land which lie in its line of flight. . . . As a diver it is an expert and can penetrate to great depths; birds are said to have been taken in gill nets at a depth of 150 feet. In diving it partially opens its wings and probably uses them, as well as its feet, in swimming under water" (Bent, 1925).

The large, fatty knob at the base of the bill of the male of King Eider is considered to be a great delicacy by the Eskimo of Hudson Bay and the Eastern Arctic islands. Upon killing a bird of this species the Eskimo immediately bites off this knob and chews the tough, greasy morsel with evident relish. Many museum specimens thus show evidence of having passed through an Eskimo's hands.

Spectacled Eider

Arctonetta fischeri

(ark-to-nét-a, fish-er-i)

Colour Plate No. 25. Downy Young No. 34.

SCIENTIFIC NAME

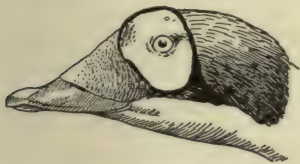
Arctonetta, from Greek, *arktos*, meaning a bear (especially the brown bear of Europe, *Ursus arctos*, also the constellation *Ursa major*), hence, the North, and *netta*, meaning a duck; *fischeri*, after Gotthelf von Waldheim Fischer (1771-1853), a Russian naturalist.

COLLOQUIAL NAMES

Fischer's eider; small pistrik (the Russian name for eider).

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head.* Crest, of stiffened yellow-green feathers on crown and hindhead; sides of crest and cheeks, sea green; a blended band over forehead, yellow green; feathers of face and forehead, plush-like; neck, chin, throat and feathers of forehead bordering bill, creamy white; a circle of dense silvery-white feathers framed in black (suggesting spectacles) around eye; eye, white, ringed with light blue; bill, dull orange, nail paler; feathering on upper and lower mandibles extends well past nostril. *Body.* Foreback and scapulars, creamy white; hindback and rump, dark brown, with greyish bloom; white patch on flanks near rump; chest, breast, belly and sides, dark greyish



brown, with whitish bloom on chest and sides; feet, dull yellowish to olive brown. Tail and its coverts, greyish brown. Wings. Lesser and middle coverts, creamy white, forward lesser coverts dusky; greater coverts, greyish brown, narrowly tipped with white, inner ones, white; primaries, dark greyish brown; outer secondaries, dusky, with small white tips; inner secondaries and tertials, long and sickle-shaped, creamy white; lining, pale greyish brown and whitish; axillars, whitish, speckled with greyish brown.

ECLIPSE PLUMAGE: The moult into the eclipse commences in June, when the brilliant plumage of the head and neck disappears; the spectacles become greyish mottled with buff and the rest of the head and neck becomes variegated with various shades of grey, buff and dusky; the white upperparts become plain brownish or dark greyish, and the white flank-spots disappear. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: The moult from eclipse to full winter plumage follows much the same sequence as that described for the American Eider.

ADULT FEMALE. The white "spectacle" of the male is represented by a clearly-discernible circle of finely-marked pale-brown feathers. Otherwise, the general appearance and coloration are the same as those of the female American Eider. Eye, brown; bill, dull bluish; feathering on bill, same as in male; feet, yellowish brown.

JUVENILE. In the first autumn the sexes are much alike but quite different from the adult female. The young male has the head and neck like those of the

adult female but the *upperparts* are darker, the feathers are brown, edged with cinnamon buff; the *underparts* are faintly barred with dusky; the *spectacle* is only faintly indicated. The young female is much the same except that the *underparts* are spotted rather than barred.

The second winter plumage, after the first eclipse, is almost fully adult, but the perfection of adult plumage is probably not achieved until after the second eclipse when the bird is over two years old. *Wing of Male*. As in adult female. *Wing of Female*. As in adult female but more brownish, and with more buffy-brown edging in *coverts*.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very large duck, with white upperparts, dark underparts and pronounced, large, white area around the eye. Chief distinguishing features (a) hind toe with lobe, (b) white "spectacle," outlined in black, around eye, (c) feathering on upper mandible extends past nostril.



The male can not be confused with any other duck.

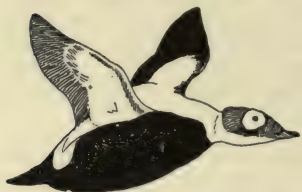
AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A very large, rich-brown, heavily-barred duck. Chief features (a) hind toe with lobe, (b) large, pale area around eye, (c) feathering on upper mandible extends past nostril.

The female is similar to the other female eiders in coloration, but is readily separated by features (b) and (c).

FIELD MARKS

(To be looked for on the northwest Arctic coasts, chiefly in Alaska.)



These are large, clumsy-looking ducks; the male has the same general coloration as that of the Northern, American and Pacific Eiders, with the white back and black breast, but in this eider the black of the breast extends forward to include the chest. The white "spectacle" of the male is noticeable at a considerable distance. The pose on the water and the style of flight are similar to those of the American Eider. The female appears as a large, rich-brown, heavily-barred duck and, except in hand,

can be separated in life from the other female eiders only if the vague spectacle is discernible.

LIFE STORY

The Spectacled Eider, while common in northeastern Siberia, is rare on this continent and is one of the least known of our wild fowl. It occupies an extremely restricted breeding range on the Arctic coast of Alaska, where, unlike Steller's Eider of the same locality, it favours the shallow, muddy coastal waters. In winter, limited numbers of these beautiful ducks are to be found scattered throughout the Aleutian Islands.

Nelson, over fifty years ago, predicted the probable extinction of

this duck in North America. He says (1887): "In addition to the natural struggle for existence the species has to contend against thousands of shotguns in the hands of the natives. The diminution in all the species of water-fowl breeding along the coast is more and more marked each season; and while this may mean a desertion of one region for another in the case of the great majority of geese and ducks, yet for such narrowly limited species as the Spectacled Eider, and to a less extent the Emperor Goose, this diminution is but the beginning of extermination. Moreover, the present scarcity of large game along the coast is having great effect in causing the natives to wage a continually increasing warfare upon the feathered game."

For its nesting sites this eider chooses tussocks of dry grass on small islands, or knolls close to the edge of fresh or brackish ponds. The nest itself is usually a hollow in the ground lined with grasses and down. The number of eggs, varying from 5 to 9, are of a greenish or olive buff colour and average 2.57 by 1.76 inches.

In the Hooper Bay district, Alaska, Conover found these birds nesting and noticed that almost all of them seemed to come from the north, and passing Point Dall, enter Hooper Bay. He says (1926): "Undoubtedly the flocks we saw were composed entirely of birds that were coming to nest in the immediate vicinity, but their arrival from the north suggests that they may winter in some part of northern Bering Sea. They did not nest commonly on Point Dall, but were abundant nesters on the flats about Igiak Bay. The first eggs were found on June 13. The nests were built generally close to the shore of some pond. The females were very solicitous and very tame. . . .

"Young were first seen on July 8, but they were evidently several days old. Broods of this duck soon became common. Twice, two females were seen with one brood, the first of four and the second of nine ducklings. In both cases all the young seemed to be of the same size, and it was impossible to tell whether two broods were mixed together or whether all belonged to one female. Both old ones showed great anxiety, and while one stayed with the young, the other would flap about wildly, finally coming ashore in an attempt to lead me off."

The male is rarely seen after the young are hatched and the duty of raising the family devolves upon the female, who shows the greatest courage in guarding her brood, as the following incident, recorded by Nelson (1887) will show. He says: "A brood was swimming away from me, and the female tried to protect them by keeping between the young and myself. I fired two charges of No. 12 shot, killing all the young, yet, in spite of the fact that the parent received a large share of the charge each time, she refused to fly, and kept trying to urge her dead offspring to move on, until a charge of larger shot mercifully stretched her among her offspring. Upon removing her skin, her back was found to be filled with fine shot, and her desperate courage in defense of her brood shows the strength of parental feeling. Other similar instances attest the courage and devotion of this species."

The same author gives the following account, indicating enmity between this eider and the glaucous gull: "The large glaucous gulls probably do great damage to the young of this bird. An experience that I had one day strengthened this belief. I had come to a pond where there was an old Spectacled Eider with three young. As I was watching them, I noticed that two pairs of the large gulls were nesting around this same pond. One of these gulls was shot, dropping into the water near the old duck. She immediately left her brood and fluttered toward the gull, calling excitedly. At first she was very cautious, staying several feet away from it, but finally gathering courage she dashed at the dead bird, jumped over it, and as she did so, made a half-hearted peck at the carcass. This was repeated again and again. Liking her courage, I decided to help her family, so shot the remaining gulls. The female became almost beside herself with anxiety, and when I left, was dashing from one dead gull to the other."



The Spectacled Eider is apparently more of a vegetarian than the other eiders. Only sixteen stomachs, however, were examined for analysis of the food of this species and this number is too small to give more than a suggestion of food preferences. Slightly more than three-quarters of the food consumed by the birds examined consisted of animal matter as indicated by the following percentages: molluscs, 42; insects, 32; crustaceans, 3; total animal food, 77 per cent. Pondweeds, 7; crowberry, 2; marehail, 1; sedges, 2; miscellaneous plant food, 11; total vegetable food, 23 per cent.

White-Winged Scoter

Melanitta deglandi

(*Melanitta fusca deglandi*, of Peters)

(mel-a-nít-a, de-glánd-i; fús-ka)

Colour Plate No. 26. Juvenile No. 27. Downy Young No. 35.

Melanitta, from Greek, *melas*, *melanos*, meaning black, and *netta*, meaning a duck; *deglandi*, in honour of Dr. Côme Damieu Degland (1787-1856), a French naturalist and director of Museum d'Histoire Naturelle of Lille; author of a work on European birds published in 1849; *fusca*, Latin, meaning dusky.

COLLOQUIAL NAMES

IN GENERAL USE: Coot; whitewing; whitewinger; whitewinged coot. IN LOCAL USE: Bay coot (female and immature); bay muscovie; beach comber; bell-tongue



coot; black duck; black whitewing; booby; brant coot; brass-wing diver; brown coot (female and immature); bull-coot (the male); bull whitewing (the male); channel duck; deaf duck; eastern whitewing; gibier noir (black fowl); gray coot (female and immature); gray whitewing (female and immature); half moon-eye; ice duck; Indian duck; iron pot; Klondike mallard; macreuse (the specific French name for scoter, trace-

able to an old word meaning spotted); May whitewing; muscova; nigger duck; niggerhead; old grey coot; old iron put; petit noir (little black); pied-winged coot; rock coot; scooter; scutter duck; sea brant; sea coot; sea horse; semblymen (contraction of assemblymen); siwash duck; squaw duck; tar bucket; tar pot; Uncle Sam coot; velvet duck; white-eyed coot; white-eye; whitewing diver.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *neck*, black, with small crescent-shaped white spot behind and below eye; *bill*, edges of both mandibles, black; sides of upper mandible, red or purplish, shading to orange near base, ridge, white; prominent black knob at base above; lower mandible, reddish orange at tip, white in centre, base black; *nail*, large, fused, reddish orange, often with narrow black line on each side, running back to knob; *nostril*, round and large, feathering on ridge extends nearly as far as nostril, and feathering on sides nearly as far as on ridge; *eye*, white or pale blue grey; *eyelid*, dusky. *Body* and *Tail*. Entire plumage black, with brownish tinge on *sides* and *breast*. *Feet*, orange vermillion, on inner sides, outer sides, purplish pink; *webs* dusky to black; *toes*, irregularly marked with black. *Wings*, black, with tips of *greater coverts* and *speculum*, white; *lining*, dusky brown and silvery brown; *axillars*, dusky brown.

ECLIPSE PLUMAGE: There is no eclipse plumage. Instead there is a partial prenuptial moult in March and April, involving the body-feathers and tail, and

a complete postnuptial moult in August and September, during which the flight-feathers are shed and the birds are incapable of flight until these are renewed.

AUTUMN PLUMAGE: Same as winter plumage.

ADULT FEMALE. *Head and neck*, brownish black, sometimes with two indistinct whitish spots in region of ear and before eye; *bill*, dull black, more or less mixed with whitish on upper mandible, sometimes a patch of deep pink on sides, knob less prominent than in male; *eye*, dark brown. *Body*. Entire body blackish brown; some feathers of *scapulars*, *sides* and *breast*, edged with whitish; *feet*, light brownish red; *webs* blackish. *Tail* and its coverts, blackish brown. *Wings*, blackish brown, with white *speculum*; *lining* and *axillars*, same as in male.

JUVENILE. During first autumn the sexes are alike, dark sooty brown, blackish on *crown* and *back*, paler on *breast*, sometimes even whitish; conspicuous white patches on sides of head in *ear region*, and in front of eye; *eye* of male, light grey brown, of female, dark brown; *feet* of young male, as in adult female but outer side of tarsus blackish; *feet* of young female with outer side of tarsus blackish, but inner side of tarsus and toes, dull purplish brown.

During winter, sexes begin to differentiate, males becoming blacker, females browner; white *face-patches* become obliterated; *bill* of young male shows colour but is not swollen at base. Second autumn, after first post-nuptial moult, when 14 or 15 months old, young males are practically adult, and *eye* becomes white; *bill* not at full stage of development. Third autumn, after second postnuptial moult, plumages are fully adult in both sexes. *Wing of Both Sexes*. As in adult female but *tertials*, *lesser* and *middle coverts*, usually somewhat paler. Occasionally, young female shows very much reduced white *speculum*, sometimes less than an inch wide at tips.

SPECIMEN IDENTIFICATION

MALE. General effect: A very large, black duck, with white wing-patch. Chief distinguishing features (a) hind toe with lobe, (b) white speculum, and small white patch near eye, (c) feathering on ridge of bill extends nearly to nostril, and feathering on sides of bill nearly as far as that on ridge, (d) head elongated, slope of forehead follows line of bill.

The White-winged Scoter is the only black duck of this continent with a white speculum. (The European Velvet Scoter, *Melanitta fusca*, is identical with this species except for feature (c), the feathering on bill not extending so far towards the nostril.)



FEMALE. General effect: A large, brownish-black duck, with a white wing-patch. Chief features (a) hind toe with lobe, (b) white speculum, (c) and (d) same as in male.

The white speculum will identify the female. It bears a closer resemblance to its own mate than to any other duck, but is lighter coloured, and lacks the red on upper mandible and the prominent knob at base of bill above.

JUVENILE. The juveniles can always be distinguished from the juveniles and adults of other scoters by the white speculum, and by features (c) and (d) above. See "Description."

FIELD MARKS

ON THE WATER. The largest of the scoters; both sexes appear as very large, black ducks with a pronounced white wing-patch. They sit low on the water and seem thick of body, head, and neck. At close range the white eye-patch and swollen bill of the male may be noticeable.



IN FLIGHT. The white speculum will always identify. When they are once under way, the flight is strong, direct, and well sustained, but it is laboured until momentum has been gained.

VOICE. A silent bird on the water; but in flight it sometimes utters a bell-like, low whistle in a series of six or eight

notes, hence the name bell-tongued coot; it also utters a short croak.

LIFE STORY

The White-winged Scoter is the largest and probably the most plentiful of the three scoters found in North America. Due no doubt to the encroachment of civilization on its breeding grounds in the interior and to the droughts of recent years, its numbers have become substantially lessened, though it still exists in such large quantities that there is not the slightest fear of its extermination. The White-wing is the commonest scoter of the interior; it is also found on both the Atlantic and Pacific coasts, though it is much more common in the east, where it is very generally, though incorrectly, called "coot." It is closely related to the European Velvet Scoter, which it resembles in both appearance and habits. It is a powerful flier, a strong swimmer, and an expert diver; when wounded it can swim for such long distances under water that pursuit is almost useless.

The White-winged Scoter breeds across the whole of western North America, but nowhere in particular in this extensive range is it found as an abundant breeder. The nests are built on the ground in a scraped-out hollow, lined with sticks, leaves, rubbish and the dark grey down from the mother's breast; they are usually well concealed under shrubs or bushes. The number of eggs varies from 9 to 14 and the average size is 2.57 by 1.80 inches. The colour of the eggs is pale salmon or pinkish and the shell is often finely granulated or minutely pitted. This scoter is a late breeder, nesting in the latter part of June.

"The flight of the White-winged Scoter is heavy and apparently labored; it seems to experience considerable difficulty in lifting its heavy body from the surface of the water; except when facing a strong wind, it has to patter along the surface for some distance, using its feet to gain momentum. But, when well under way, it is much swifter than it seems, is strong, direct, and well sustained. Migrating flocks, in all sorts of irregular formations, fly high under favorable circumstances; but when

flying against the wind or in stormy weather (northeast storms seem to be particularly favorable for the migration of the scoters) they fly close to the water and in rough weather they take advantage of the eddies between the waves. The flight is usually along the seacoast, following all the large indentations of the coast and crossing the smaller bays; but, where considerable distance is to be gained they often fly across capes or necks of land, usually all at about the same place." Gunners take advantage of this confirmed habit and assemble at these places in large numbers to shoot at the passing flocks; "when flying against a strong south wind they usually fly low enough to shoot, but, if not, a loud shout from the gunners often brings them scurrying down to within range" (Bent, 1925).

The food of the White-winged Scoter comes almost entirely from the animal kingdom. The stomach contents of 819 of these birds, taken during every month except June and September, and collected in 15 States, Alaska, and 5 Canadian Provinces, upon analysis gave the following approximate percentages of diet: molluscs (including rock clams, 14; oysters, 14, blue mussels, 12, scallops, 3), 75; crustaceans, 13; insects, 2; fishes, 2; miscellaneous animal food, 2; total animal food, 94 per cent. Eelgrass, 2 burr reed, 1; miscellaneous plant food, 3; total plant food, 6 per cent. Almost every bird examined in this food study had consumed some sand or gravel but in smaller volume than is the case with many other waterfowl. The quantity found in reasonably full stomachs ranged from a trace to about 50 per cent, yet the total averaged but 7.22 per cent of the stomach content. Probably a smaller quantity of this abrasive material is taken because the molluscs, which are consumed freely, themselves serve as effective grinding material. Pebbles as large as 1 by $\frac{3}{4}$ by $\frac{1}{2}$ inch, approximately, are swallowed by these birds. Specific investigation at commercial shellfish beds in Massachusetts showed that scallops formed about half the food of a series of White-winged Scoters collected there, and a similar investigation at planted oyster beds in Washington revealed that oysters were supplying a like quantity. Such examples represent extreme cases, yet under such circumstances protective measures or control operations are imperative. Fortunately these birds, along with most of the true sea ducks, feed almost entirely by day and are fairly easily driven out by the operation of a motorboat equipped with loud sirens, particularly when combined with a little shooting.

The strength and degree of elasticity of the stomach of this sea-fowl is surprising, and the grinding power of its gizzard is almost unbelievable. Oysters and other molluscs are swallowed whole and many shells, that require a hard blow of a hammer to break, are readily ground and chemically disintegrated in the gizzard of this sea-fowl. In the gullet of one bird, collected over an oyster bed, were found no less than 10 oysters, one measuring over two inches in length. The remains of 46 oysters were found in the gizzard of another. In the gullet of a bird collected over a scallop bed were four shells, the largest being nearly 2 inches long and

the smallest $1\frac{3}{8}$ inches, while the remains of three scallops of similar size were found in its gizzard. Mussels of over $2\frac{1}{2}$ inches have been found in the gullets of these ducks. Diving ducks sometimes meet their death by having the mussel they are attempting to swallow clamp onto their tongue or bill and so cause them to drown.

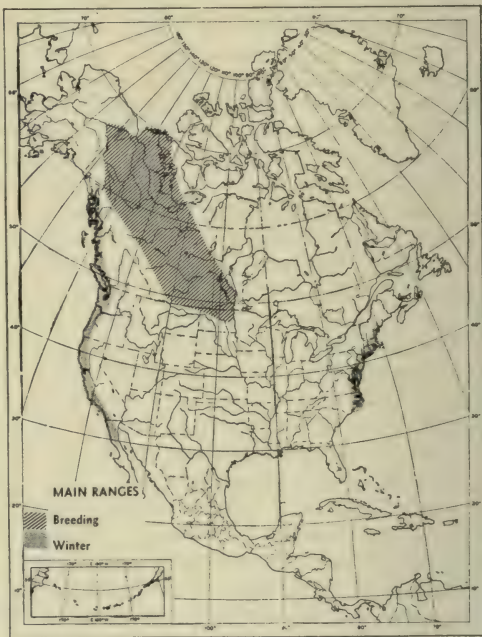
These birds have some habits unlike those of other ducks. J. M. Edson, in notes quoted by Bent (1925), says that during the summer, particularly if the weather be pleasant, and usually in the late afternoon, they have a habit of leaving the water and taking a flight overland; the birds rise in considerable flocks to an elevation of 200 or 300 feet, stringing out in line or in converging lines, sometimes forming a V. The flights are of short duration, and after a little while the flocks may be seen returning to resettle on the water offshore. He records another instance of the peculiar behaviour of these scoters: "Watching the sea birds from a bluff . . . on a calm evening in December (the 24th), my attention was attracted by unusual activity in a little group of White-winged Scoters. . . . Ten of these birds were bunched together and actively swimming and plunging about within a circle of perhaps 10 or 12 feet in diameter. I was unable to distinguish the sexes with certainty, and have no knowledge to the effect that December is their courtship season. It looked like a game of tag of some sort. At the center of the group two birds would assume a pose as if billing and caressing each other, one with its head elevated, the other's depressed, the bills coming in contact. The pose would last only two or three seconds, till some other bird would approach one of them from behind, then the latter would suddenly turn upon it and chase it away, the pursued bird taking a circular course around the flock. Sometimes both the posing birds would be simultaneously approached, and each would turn upon his assailant. The other birds would hover close about, watching for a chance to tag the posers from behind. The two main actors would again come to the center and resume their pose, only to be promptly interrupted again with the same result. . . . I watched them for perhaps half an hour, and the game was still in progress when I left." Again in February Edson saw the same performance enacted by about the same number of birds and the play was as before.

In spring the flight northward along the Atlantic coast commences early in March and is at its height in the first half of May. In addition to this northward movement, a western overland flight takes place during May. This flight is composed entirely of adult birds that breed in the Canadian interior, and which do not seem to heed the northward movement of the others of their kind. Instead, they gather in large flocks of several thousands until the time arrives for their departure, which is usually about the 12th or the 15th of May. In autumn, on the Atlantic coast, some flocks appear during the latter part of August and throughout September, but the main flight takes place in October. Winter, on the Atlantic coast, is spent from the Gulf of St. Lawrence to South Carolina, with the centre of the winter range on the waters of

Long Island and Vineyard Sounds. Here these scoters feed on the mussel beds of the submerged ledges and sunken rocks, and may be seen sleeping and resting in huge rafts far offshore. On the Pacific coast they winter from the Aleutian Islands to the coast of Lower California. It is said that on their migrations these birds do not feed, but that on alighting on some large body of water to rest they immediately tuck their bills in the feathers of the back and fall fast asleep.

On the New England coast scoters are known generally as "coots" and are much sought by the gunners of the East. Bent (1925) gives the following delightful account of this sport as it was practised some decades ago, before the adoption of some of the present-day hunting regulations: "The time-honored sport of coot shooting has for generations been one of the most popular and important forms of wildfowl hunting on the New England coast. Next to the Black Duck, which undoubtedly stands first in the estimation of our sportsmen, there are probably more scoters killed on our coasts than any other of the *Anatidae*. Aside from the fact that the scoters are not of much value for the table, coot shooting has much to recommend it; it is a rough and rugged sport, testing the strength, endurance, and skill of an experienced boatman; the birds are strong fliers and hard to kill, requiring the best of marksmanship, under serious difficulties, and hard-shooting guns; during good flights game is almost always within sight, giving the sportsman much pleasant anticipation; and chances are frequently offered to show his skill at difficult and long shots. I was born and bred to be a coot shooter, inheriting the instinct from three generations ahead of me, and I only wish that I could impart to my readers a small fraction of the pleasure we have enjoyed in following this fascinating sport.

"Rudely awakened at an unseemly hour, soon after midnight it seems, the party of gunners are given an early breakfast before starting out. It is dark as midnight as we grope our way down to the beach, heavily laden with paraphernalia, launch our boats in a sheltered cove among the rocks, and row out onto the ocean. The crisp October air



is cool and fresh, as the light northwest wind comes in over the ledges, fragrant with the odors of kelp and rockweed. There is hardly light enough at first to see the line of boats strung out straight offshore from the point, but soon we find our place in the line, anchor our several strings of wooden decoys, and then anchor our dory within easy gunshot of the nearest decoys, which if correctly placed are the smallest and most life-like; the largest decoys are merely to attract the birds from long distances. Perhaps before our decoys are set we have seen a few shadowy forms flitting past us in the gloom, or heard the whistle of their wings in the dark, the beginning of the morning flight; occasionally the flash of a gun is seen along the line and the day's sport has begun. As the gray of early dawn creeps upward from the sea we can clearly distinguish the long line of boats, perhaps a dozen or fifteen, anchored at regular intervals, a little less than two gunshots apart so that birds can not slip through the line, and extending for several miles offshore, an effective barrier to passing flocks. Every eye is turned northward, looking up the coast and straining to discover the minute specks in the distance, as the first flock appears several miles away. 'Nor'ard,' the warning signal is passed along the line, as some keen eye has made the longed-for discovery, and every gunner crouches in his boat to watch and wait and hope for a shot. Soon we can make them out, an irregular, wavering bunch of black specks, close to the water and well inshore. The boom of distant guns tells us that other gunners up the coast have seen them and perhaps taken their toll. On they come, now strung out in a long line headed straight for us, big black birds with flashing white wing-patches, 'bull white wings,' as the males of this species are called; we shall surely get a shot. But no, they have seen us and swerved, flying along the line seaward; a shot from the next boat drops a single bird and they pass through the line beyond, dropping two more of their number. A bunch of young Surf Scoters, 'gray coots,' is headed for the next boat, and we try to attract their attention by imitating the whistling of their wings; they turn and swing in over our decoys, dropping their feet and preparing to alight; four barrels are fired in quick succession and three of them drop in the water. Two of them will die as they are lying on their backs with feet kicking the air, but the other has its head up and is swimming away. We throw over our anchor buoy and give chase, but cripples are hard to hit in the water and we have a long pull and plenty of shooting before we land him. Meantime we have missed a magnificent shot at a large flock of 'skunk heads,' Surf Scoters, which circled over our decoys and escaped through the gap, and on our return we find only one of our 'dead' birds.

"A temporary lull in the flight gives us a chance to rest and admire the beauty of the scene around us; the delicate blush of dawn deepens and brightens as the gorgeous hues of sunrise spread from the eastern horizon over the broad expanse of sky and sea, a rapidly changing play of colors until the sun itself appears over the water and bright daylight

gilds the ocean. Bird life is not lacking in the scene; herring gulls are flying about on all sides, often coming near enough to tempt us to shoot at them; but never quite near enough to kill; they seem to know just how far a gun will shoot. Occasionally a black-backed or a few kittiwake gulls are seen. Loons are frequently passing, generally high in the air, with long outstretched necks, flying swiftly in a straight line, their bodies propelled by rapid wing strokes; they often fly within gunshot, but are tough and hard to kill. Large flocks of Old-squaws make interesting shooting, as they twist and turn and wheel in compact bunches; they are swift of wing and not easy to hit; their weird cries add a tinge of wildness to the scene. On rare occasions the sport is enlivened by a shot at a flock of Brant, and our pulse runs high when we see a long line of big black birds with white bellies headed for our boat, flying close to the water; we are lucky if we get any for they are very shy.

"The little 'gray coots,' the young of the American and the Surf Scoters, give the best shooting and are the best for the table; they decoy well, particularly when in small flocks, and are easily killed; a pair or a single bird will often circle about the decoys again and again, giving plenty of chances for long single shots. 'Butter bills' and 'skunk heads,' the adults of these two species, decoy well in small flocks, but large flocks are usually wild and either pass the line high in the air or circle out around the end of it. Fifteen or twenty birds is considered a good day's sport, but as many as 135 birds have been killed in a day by two gunners in one boat, or over 90 by a single gunner. Although they are thus persecuted year after year throughout the whole length of their migration route, they do not seem to have diminished materially in numbers since the time of our earliest records, and vast numbers of them still migrate along our coast."

To the foregoing interesting account of the sport of "coot" shooting, may be added a few words by Rich (1907): "One oddity in the gentle art of duck shooting is the practice of 'hollerin' coots'—that is, of making a great noise when a flock is passing by out of shot—when they will often turn and come to the decoys. The report of a gun sometimes has the same effect, but we New Englanders are too thrifty to waste powder and lead where our vocal organs will serve as well." Finally, Heilner, in his excellent work, *A Book on Duck Shooting* (1939), concludes a delightful chapter on an account of a day's coot shooting in the following words: "At last we tore ourselves away and reluctantly turned homeward towards Chatham, Barnstable, and Boston. Let others have their canvas-back and mallard. Let others have their honkers and their wavies. Give me the long lines of dories anchored off Barnstable or Gurnet Point, the ever-wheeling gannets and the flash of the light at North Truro. And when I'm too old to gun any more, take me down on Monomoy the day of a big northwester and sit me on a chair to watch the skunk-heads run the gantlet. And when you take me home that night I want a big red-hot, steaming plate-full of good old coot stew!"

Surf Scoter

Melanitta perspicillata

(mel-a-nit-a, per-spik-il-á-ta)

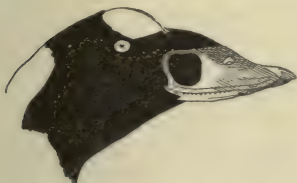
Colour Plate No. 27. Downy Young No. 35.

SCIENTIFIC NAME

Melanitta, from Greek, *melas*, *melanos*, meaning black, and *netta*, meaning a duck; *perspicillata*, Latin, meaning conspicuous, spectacular (referring to the peculiar and striking bill).

COLLOQUIAL NAMES

IN GENERAL USE: Coot. IN LOCAL USE: Bald-headed coot; baldplate; bay coot; bay muscovie; beach comber; black coot; blackduck; black sea-duck; blossom bill; blossom head; booby; bottlenosed diver; brown coot (female and immature); butterboat-bill; butterboat-billed coot; deaf duck; gibier noir (black fowl); gog



glenose; gray coot (female and immature); horse-head; horsehead coot; Indian duck; iron pot; Jew duck; king coot; macreuse (the specific French vernacular for Scoter, traced to and old word meaning spotted); morrocojaw; mussel bill; nigger duck; niggerhead; old iron pot; patch bill; patch-head; patch-head coot; patch-polled coot; petit noir (little black); pishang (female and immature); plaster bill; river coot; rock coot; scooter; 'scovy (contraction

of muscovy); scutter duck; sea coot; siwash duck; skunkbill; skunkbill coot; skunk-head; skunkhead coot; skunktop; sleepy diver; snuff-taker; speckle-billed coot; spectacle coot; spectacle duck; squaw duck; surf coot; surf duck; surf scooter; surfer; tar-bucket; tarpot; whitebill coot; whitehead; whitehead coot; whitescop.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and neck*, black, except for white patch on *forehead* (lacking in yearlings), and a long, triangular patch of white on *nape*, pointing backwards; white feathers on nape intermixed with shorter, completely concealed, black ones; *bill*, a round or squarish black patch on side near base, margined behind by red, above by orange, and in front and below by a patch of white; ridge and region around nostril, red; tip and *nail*, pale yellow; lower mandible, yellow towards base and flesh coloured elsewhere; frontal feathers extending along ridge nearly to nostril, but no feathers on side of bill; feathers on chin extend about half-way to tip of lower mandible; bill swollen near base, nail large and fused; nostril about middle of bill; *eye*, white to pale bluish white. *Body, Tail and Wings.* Entire *back, chest, tail and wings*, black; *breast and sides*, brownish black; *belly*, brownish black, mottled with lighter brown; *wing-lining*, brownish black and silvery grey; *axillars*, dusky brown; *feet*, bright red on outer side, orange red on inner side, tarsus and toes marked with dusky; *webs*, black.

ECLIPSE PLUMAGE: There is no eclipse plumage. Instead there is a partial prenuptial moult in March and April, involving the body-feathers and tail, and the white feathers on nape. During a complete postnuptial moult in August and September, the flight-feathers are shed and the birds are incapable of flight until these are renewed.

AUTUMN PLUMAGE: Same as winter plumage.

ADULT FEMALE. *Head and neck*, dusky brown, with vague whitish patch on back of head (lacking in yearlings), the whitish colour being produced by presence of short, dark-brown feathers among the white; *crown*, to just below eye, black; *cheeks*, with two obscure white patches, one over ear, and the other between eye and base of bill; *bill*, blackish, with black patch at base, surrounded by pale grey; bill, less swollen than in male, and frontal feathers not extending as far along ridge of bill; *eye*, brown. *Body, Tail and Wings*, all blackish brown; *breast*, mottled greyish and dusky; *belly*, dusky brown; *wing-lining*, dusky brown and silvery brown; *axillars*, dusky brown; *feet*, dull yellowish to dull brownish red; *webs* dusky.

JUVENILE. In first autumn the sexes are alike, and similar to adult female but without whitish patch on back of head; the two light patches on *side of head* often clear white; *breast*, pale grey or whitish. During first winter, sexes begin to differentiate, males becoming blacker and females browner; during spring young males acquire white patch on *back of head* but not the white fore-head-patch, and bill develops in colour and size. By second autumn, after first post-nuptial moult, plumage is practically adult. By third autumn, after second post-nuptial moult, when 27 or 28 months old, the plumage is fully adult. *Wing of Both Sexes.* As in adult female. Occasionally, young female has the *coverts* slightly paler.

SPECIMEN IDENTIFICATION

MALE. General effect: A medium-sized, black duck, with two white patches on the head, and a peculiar bill. Chief distinguishing features (a) hind toe with lobe, (b) white patch on forehead and another on nape (note that the white feathers on nape are shed at times, leaving an area of black down which is discernible only on close examination), (c) head elongated, forehead following slope of bill, (d) a peculiar varicoloured bill; feathers on ridge of bill extend nearly to nostril, but no feathers on side of bill as in White-winged Scoter (see "Description").

The lack of white speculum will separate from the White-winged Scoter; and the white head-patches and shape of head and bill from the American Scoter and all other ducks.

FEMALE. General effect: A medium-sized, dark-brown duck, with a greyish breast. Chief features (a) hind toe with lobe, (b) black crown, two poorly defined, white cheek-patch, and whitish patch on back of head, (c) as in male.

The lack of white speculum will separate from female White-winged Scoter, and shape of head, feature (c), from female American Scoter and any other duck.

JUVENILE. The juveniles can be distinguished from the juveniles and adults of other scoters by features (c) and (d) above. See "Description."

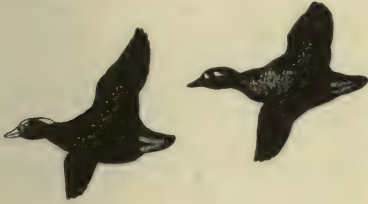
FIELD MARKS

ON THE WATER. Both sexes appear as large, black, thickset ducks. The males are recognized by the white patches on the nape and forehead and by the peculiar bill, which features are clearly noticeable even at a considerable distance.



The two whitish face-patches of the dark brown female are usually easily seen. An excellent field mark is the action of the birds when alighting; as the Surf Scoter touches the water the wings are extended upward and so held as the body ploughs

through the water to a standstill. The female is at times difficult to separate from the female American Scoter but the latter has whiter cheeks and sits with the bill held horizontally or slightly tilted upwards instead of pointing downwards like the bill of the Surf Scoter. The white speculum of the White-winged Scoter will distinguish that species.



IN FLIGHT. They fly in large flocks in irregular formation, with a loud humming of the wings, audible even when the flock is at a considerable distance. In flight these scoters look like the American Scoters, but can be distinguished by the white head-patches (more prominent in the males) and by the lack of silvery sheen on the under-surface of the flight-feathers.

VOICE. A very silent bird; the only sounds are an occasional low, guttural croak, and, in the mating season, a low, clear whistle, a low liquid note.

LIFE STORY

The Surf Scoter and the White-winged Scoter are about equal in abundance, though the latter is probably more frequently encountered inland. Like the other scoters, this species is commonly called "coot," in spite of the fact that the coot proper is a lobe-footed bird. These scoters are much sought by gunners of the New England coasts and a full description of the sport is given in the "Life Story" of the White-winged Scoter. The young of this scoter and of the American Scoter, known as "grey coots," are the best for the table. Contrary opinions, as strong as the flesh of the bird itself, are held on the merits of the meat for human consumption. As the American Scoter seems to find preference with the eaters of "coot," suggested methods of preparing these birds for the table will be found in the "Life Story" of that species.

"The flight of the Surf Scoter is not quite so heavy as that of the White-winged Scoter; it is a smaller, lighter, and livelier bird on the wing, but it so closely resembles the American Scoter in flight that the two cannot be distinguished at any great distance. It rises heavily from the surface of the water and experiences considerable difficulty in doing so unless there is some wind, which it must face in order to rise. This necessity of rising against the wind is well understood by gunners who take advantage of it to approach a flock of bedded birds from the windward, forcing the birds to rise toward the boat and thus come a little nearer. When once under way the flight is strong, swift, and well sustained. In calm weather or in light winds, migrating birds fly high, but in windy or stormy weather they plod along close to the waves. They often fly in large flocks or irregular bunches without any attempt at regular formation, following the coast line, as a rule, but sometimes passing over capes or points to make short cuts As a diver the Surf Scoter is fully equal to the other sea ducks, depending on its diving powers in

its daily pursuit of food and to escape from its enemies in emergencies. It dives with an awkward splash, but very quickly and effectively, opening its wings as it goes under, and using them in its subaqueous flight. It can remain under for a long time and swim for a long distance without coming up; it is useless to attempt to chase a slightly wounded bird" (Bent, 1925). As a rule scoters dislike flying over land and usually follow the coast line. When they do encounter a bold cape they are evidently at a loss. Sometimes they will turn one way, then another, and either decide to follow the shore around the cape, increase their elevation to a considerable height and fly over the cape, or turn back and settle in the water as though to decide what course to pursue. It is characteristic of the flight of these scoters that an audible, deep whistling of the wings accompanies the few beats of the wings just as the bird alights on, or rises from the water, and that it holds its wings extended upward for a short interval after alighting.

As their name implies, these birds are adepts in diving through the breaking surf. Mrs. Bailey (1916) describes their ability in this regard as follows: "It was a pretty sight when, under a gray sky, the beautiful long green rolls of surf rose and combed over and the Surf Scoters came in the from the green swells behind to feed in front of the surf and do skillful diving stunts to escape being pounded by the white waterfalls. As the green wall ridged up over their heads they would sit unmoved, but just as the white line of foam began to appear along the crest they would dive, staying under till the surf had broken and the water was level again. When diving through the green rollers near the shore the black bodies of the scoters, paddling feet and all, showed as plainly as beetles in yellow amber."

Nearly nine-tenths of the food of this duck is from the animal kingdom. One hundred sixty-eight adults were collected in 13 States, Alaska, and 7 Canadian Provinces, in every month of the year, and an analysis of the stomachs gave the following approximate percentages of diet: molluscs (including the blue mussel, 29), 61; crustaceans, 10; insects, 10; fishes, 3; miscellaneous animal food, 4; total animal food, 88 per cent. Pondweeds, 3; miscellaneous plant food, 9; total plant food, 12 per cent. Gravel averaged about 18 per cent of the total stomach volume. An analysis of the stomach contents of seven juveniles collected in July and August showed that young birds consumed six times as many insects, less than one-third as many molluscs and nearly twice as much plant food as the adults; this modified diet no doubt accounts for the greater palatability of the flesh of juveniles. Many of the stomachs of the adult birds were collected during an investigation to determine the extent of their depredations on the commercial shellfish beds off the coast of Massachusetts; neither oysters nor scallops were taken to any extent and it was established that the Surf Scoter cannot be considered a serious menace to the shellfish industry. Both the White-winged Scoter and the American Scoter indulge in these choice molluscs to a far greater extent than does this species.

The courtship of this species is thus described by Alford (1920): "I once watched 8 male Surf Scoters wooing one female, and a most absurd spectacle it was. Immediately the female dived, down went all her admirers in pursuit. Then after a lapse of about 40 seconds the males would reappear one by one, the female, who was always the last to rise to the surface, being invariably accompanied by one male; but whether it was the same male on each occasion I was unable to distinguish. For a few seconds pandemonium would reign, the rejected suitors splashing through the water and pecking at their rivals in the most vicious manner, whilst the object of their desire floated serenely in their midst, apparently well pleased that she should be the object of so much commotion. Then she would dive again, and so the performance continued for over an hour, when they drifted out of sight." Dawson (1909), describing the courtship of one female by five males, says that he has watched the display continue for half an hour at a time, "off and on, and the villains still pursue her."



Though the Surf Scoter breeds over a wide area, its nests are seldom found. The site chosen is invariably in some inaccessible region and the nest itself carefully concealed. Audubon (1840) described a nest he found as "entirely composed of withered and rotten weeds, the former being circularly arranged over the latter, producing a well-rounded cavity 6 inches in diameter by $2\frac{1}{2}$ in depth. The borders of this inner cup were lined with the down of the bird." The nest was snugly placed amid the tall leaves of a bunch of grass, and was in a marsh so unsafe that more than once he feared that he might never reach its margin. The number of eggs varies from 5 to 9, the colour is pinkish or buffy white, the shell, smooth but not glossy and the average size, 2.42 by 1.69 inches.

In spring the main northward flight of these birds takes place in May, when in countless numbers they wing their way along the coasts to their summer breeding grounds. In autumn the return voyage is made in September and October, the older birds usually preceding the younger by a week or two. On the Atlantic coast the winter is spent from the Bay of Fundy to Florida; on the Pacific coast, from the Aleutians to Lower California. Many Surf Scoters find their way to the Great Lakes.

American Scoter

Oidemia americana
(ee-dé-mi-a, a-mer-i-kán-a)

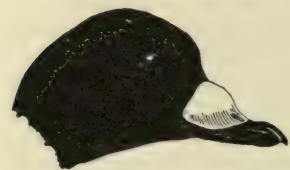
Colour Plate No. 26. Juvenile No. 27. Downy Young No. 35.

SCIENTIFIC NAME

Oidemia, from Greek, *oidema*, or Latin *oedema*, meaning a swelling (referring to the enlargement at base of bill); *americana*, Latinized form, meaning of America.

COLLOQUIAL NAMES

IN GENERAL USE: Coot. IN LOCAL USE: Bay muscovie; beach-comber; beetle-head; black coot; black duck; booby; booby duck (juvenile); broad-billed coot; brown coot (the female and immature); butter-bill; butter-billed coot; butter-nose; copperbill; coppernote; deaf duck; fitzy; fizzy; gibier noir (black fowl); gray coot; hollow-billed coot; Indian duck; iron pot; little grey coot (female and immature); macreuse (the specific French name for scoter, traceable to an old word meaning spotted); nigger duck; niggerhead; old iron pot; petit noir (little black); punkin-blossom coot; rock coot; scooter; scutter duck; sea coot; siwash duck; squaw duck; smutty; smutty coot (female and immature) tar bucket; tar pot; whistling coot; whistling duck; yellow-billed coot; yellow-nosed coot.



DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head and neck*, entirely black; feathers of *cheeks and neck*, pointed at tips and somewhat crimped in appearance; *bill*, blackish, with orange-yellow protuberance back of nostril; *nostril* slightly ahead of middle of bill; *nail*, fused, occupying entire tip of bill, which is decurved; feathering at base of upper mandible ends square across and is not extended along ridge as in other scoters; *eye*, dark brown. *Body, Tail and Wings*, entirely black, less glossy on *underparts*; first *primary* feather (see Glossary) deeply emarginate; under-surface of *primaries* shows silvery sheen; *wing-lining*, brownish black and silvery grey; *axillars*, brownish black; *feet*, brownish black, with dusky webs.



Above, first primary feather of adult male. Below, of adult female and juveniles.

ECLIPSE PLUMAGE: There is no eclipse plumage. Instead there is a partial prenuptial moult in March and April, involving the body-feathers and tail, and a complete postnuptial moult in August and September, during which the flight-feathers are shed and the birds are incapable of flight until these are renewed.

AUTUMN PLUMAGE: Same as winter plumage.

ADULT FEMALE. *Head. Crown*, dark dusky brown; *cheek, chin, throat and foreneck*, pale grey, finely barred and spotted with dusky; *hindneck*, dark dusky

brown; *bill*, blackish, marked or streaked with yellow near nostril, without the protuberance of the male; *eye*, brown. *Body*, *Tail* and *Wings*, dark dusky brown, tips of worn feathers sometimes giving a slight cross-barred pattern; *breast*, paler brown than back; first *primary* feather (see Glossary), slightly emarginate; *wing-lining*, dusky brown and silvery grey; *axillars*, dusky brown; *feet*, olive to blackish, with dusky *webs*.

JUVENILE. During first autumn the sexes are alike, and similar to adult female but paler; *upperparts*, deep rich brown, darkest on *crown*; *chest* and *sides*, paler brown; *breast*, whitish, marked with greyish brown; *belly*, brownish (in this plumage they are known as "grey coots"). During first winter, sexes begin to differentiate, and young males gradually become black, except on *breast* and *wings*; *bill* begins to develop colour and shape of bill of adult. Second autumn, after first postnuptial moult, plumage is fully adult, and the *bill* developed in colour and size. *Wing of Male*. As in adult female but first *primary* (see Glossary) slightly different shape, being more tapered than emarginate. *Wing of Female*. As in adult female but *lesser* and *middle coverts*, lighter brown; first *primary*, slightly less emarginate.

SPECIMEN IDENTIFICATION

MALE. General effect: A large, absolutely coal-black duck, without any white or lighter colour. Chief distinguishing features (a) hind toe with lobe, (b) yellow protuberance at base of bill above, (c) feathering of forehead ends square across base of mill, (d) high forehead and rounded head.

The absence of any white in the plumage, and the yellow protuberance on bill, will separate from all other ducks.

FEMALE. General effect: A large, dusky-brown duck, with whitish cheeks. Chief features (a) hind toe with lobe, (b) very dark crown, clearly defined against cheeks, chin and throat, (c) and (d) as in male.

The whitish cheeks and foreneck with dark crown and hindneck are distinctive features. The female Surf Scoter also shows palish cheeks but the nape is whitish as well. Features (c) and (d) will always distinguish from the other Scoters.

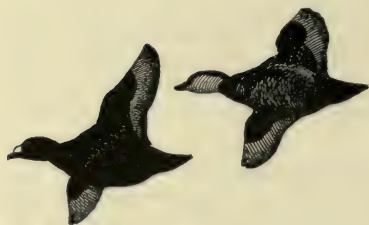
JUVENILE. The juvenile can always be distinguished from the juveniles and adults of the other scoters by features (c) and (d) above. See "Description."

FIELD MARKS

ON THE WATER. The most "duck-like" of the scoters. The absolutely black coloration of the male, unrelieved by any white, and its yellow "butter-bill" are the chief marks. The blackish-brown female has much whiter cheeks than the female Surf Scoter but is difficult to separate in life from that species, which, however, shows two fairly distinct whitish face-patches. The most outstanding characteristic of the American Scoters on the water is the carriage of the head: this is held high, the bill being either horizontal or tipped upward, never deflected downward as in the other scoters.

IN FLIGHT. The flight is finer and neater than that of the other scoters; and both sexes show a silvery sheen on the under-surface of the primaries. They rise from the water more easily than most Diving Ducks and, on their feeding





grounds, do much flying around in small flocks. It is difficult to separate the male American Scoter from the Surf Scoter in flight unless the white head-patches of the latter are visible. The white speculum of the White-winged Scoter will prevent confusion with that species.

VOICE. A prolonged musical whistle, *who-oo-hoo* and a plaintive, *coar-loo*.

LIFE STORY

The American Scoter is the least known, the rarest, and the least scoter-like of the three scoters, or "coots," as they are commonly called. The drake is the only American duck which is truly and entirely black, unrelieved by any white or other markings. This species is more closely related to the English Black Duck or Common Scoter than it is to either of the other scoters of this continent; by some authorities it is considered as belonging to the same species as the Common Scoter of Europe. It differs from the other scoters of this continent not only in being more duck-like in appearance, particularly in the shape of the head and bill, but in many of its habits and much of its behaviour. Its flight is finer; it sits differently on the water, with the bill horizontal or pointing slightly upward, while in the other scoters the bill is held downwards; it is a restless, active duck, indulging in frequent rambling flights; it loves the exposed rocky points and ledges of the coasts; and it is rarely found inland, as are the other two species.

"The American Scoter is not easily recognized in flight; its size, shape, gait, and general appearance are all much like those of the Surf Scoter, from which only the adult males can be distinguished by the head and bill markings at short range; the females and young of these two species can not be distinguished in life at any considerable distance, and many gunners do not recognize them in the hand. Its flight is not quite so heavy as that of the White-winged Scoter. All the scoters fly more swiftly than they appear to be going, but at nothing like the speed at which they have been reported to fly; I doubt if they ever fly at over 60 miles an hour or even attain that speed except under the most favorable circumstances. Migrating flocks in the fall usually fly high in fair weather, but in stormy or very windy weather the flocks sweep along close to the water and usually well inshore, following the indentations of the coast line and seldom flying over the land, except on their occasional visits to inland ponds. The flocks vary greatly in size and form, some are great irregular masses or bunches, others are strung out in long straight or curving lines, and sometimes they form in more or less regular V or U shapes. The wings make a whistling sound in flight, which the gunners imitate to attract the attention of passing flocks. All the scoters are strong, fast, and tireless swimmers, either on the surface or below it; they dive quickly and neatly and can remain under water for a long time" (Bent, 1925).

The nests of this scoter are so well concealed and are built in localities so inaccessible that they are seldom found. It is said to lay from 6 to 10 eggs which are of a light buff or pinkish buff colour, the average size being 2.44 by 1.64 inches. Regarding the care of the young by the mother, Audubon (1840) says that he "found a female with seven young ones, of which she took such effectual care that none of them fell into our hands. On several occasions, when they were fatigued by diving, she received them all on her back, and swimming deeply, though very fast, took them to the shore, where the little things lay close among the tall grass and low, tangled bushes. In this species, as in others, the male forsakes the female as soon as incubation commences."

Nine-tenths of the food of this duck is from the animal kingdom, and, as in the case of the two other scoters, consists principally of molluscs. The stomachs of 124 of these birds, collected in every month of the year except April and August, and from 8 States, Alaska, and 4 Canadian Provinces, upon analysis gave the following approximate percentages of diet: Molluscs (including the blue mussel, 27; short razor clams, 7; oysters, 6; rock clams, 5), 65; crustaceans, 17; insects, 3; fishes, 2; miscellaneous animal food, 3; total animal food, 90 per cent. Pondweeds, 5; muskgrass, 2; miscellaneous plant food, 3; total vegetable food, 10 per cent. When these scoters had been feeding over the planted commercial shellfish beds, those prized molluscs, oysters and scallops, were found to comprise as high as 44 per cent of the bill of fare.

In the spring, May is the month of greatest movement north, though many birds start the migration in April. In the autumn the migration of the American Scoter is somewhat earlier than that of the two other species. The heaviest flight on the New England coast is during the latter part of September, and consists almost entirely of adult birds; the juveniles, which are known as "grey coots," arrive during October, together with the other scoters. The favourite winter resort of these birds, on the Atlantic coast, is in the vicinity of Nantucket and Martha's Vineyard. Here they gather in enormous flocks amid the small islands and reefs, where they feed on the bounteous



supply of mussels, scallops and clams, which form the principal items of their diet.

The sport of "coot" shooting on the New England coast as described by Bent (1925) is quoted fully in the "Life Story" of the White-winged Scoter; the same writer, with regard to the culinary value of the flesh of the scoter says: "From the sportsman's standpoint the American Scoter is a more desirable game bird than the other two scoters. The young birds particularly, when they first arrive from their northern feeding grounds in the interior, are fatter, more tender, and less strongly flavored than are the others. The value of 'coots' as food has been much maligned and in my opinion unjustly; if young and tender birds are selected and if they are properly cooked their flesh is much more palatable than is generally supposed; the popular prejudice against them is largely due to an erroneous impression that they must be parboiled, which is a pernicious practice and will render any oily sea duck unfit for food by saturating the flesh with the oily flavor. There are only two proper ways to cook a sea duck; one is to skin it and broil it; and the other is to scrape as much oil out of the skin as possible and then roast it quickly in a hot oven, letting the oil run off."

In an article in *"Field and Stream"* for December, 1924, R. W. Hatch, while making some highly derogatory remarks on the value of the flesh of "coots" as food for man or dog, admits in the following words, that, properly cooked, a most savoury dish can be produced. He says: "But I do know two good ways of preparing coot that are guaranteed to make it delicious for the most epicurean hunter, and I pass this information along right now. The easiest way is to place the coot in a pot to boil with a good flat-iron or an anvil. Let it boil long and merrily, and when you can stick a fork in the flat-iron or the anvil, as the case may be, then that coot will be ready to eat. If that takes too much patience, take the goodly coot and nail it firmly to a hardwood board. Put the board in the sun for about a week. At the end of that time, carefully remove the coot from the board, throw away the coot, and cook the board."

MERGANSERSSubfamily *Merginae***Hooded Merganser***Lophodytes cucullatus*

(lo-fód-i-tez, ku-ku-lá-tus)

Colour Plates Nos. 30 and 29. Downy Young No. 35.

SCIENTIFIC NAME

Lophodytes, from Greek, *lophos*, meaning a crest, and *dutes*, meaning a diver; *cucullatus*, Latin, meaning wearing a hood.

COLLOQUIAL NAMES

IN GENERAL USE: Fish duck; sawbill. IN LOCAL USE: Bastard teal; bec-scie (meaning sawbill, sometimes misspelled "bexie"); bec-scie de cypièrre (cypress sawbill); bec-scie du lac (lake sawbill); California fish-duck; cock-robin; cock-robin duck; cottonhead; crow-duck; didapper; diver; fisher; fisher duck; fisherman; fisherman duck; fishing duck; frog-duck; fuzzhead; hairy-crown; hairyhead (most common name in Middle Atlantic States); hairy-crowned teal; hell-diver; hooder; hoota-maganzy; little fish-duck; little sheldrake (the term sheldrake has no reference to shells or molluscs, but means a drake dappled or spotted with white); little spike-bill; morning-glory; mosshead; mud sheldrake; oyster duck; peaked-bill; petit harle (little merganser); pheasant; pheasant duck; pickaxe; pickaxe sheldrake; pied sheldrake; plongeon; pond fisher; pond sawbill; pond sheldrake; sawbill diver; shagpoll; sharp; sheldrake; smew (the name of the smallest European sheldrake); snowl; spike; spikebill; spiky; strawbill; summer duck; summer sheldrake; swamp sheldrake; tadpole; topknot; tree-duck; tuffle-headed duck; water pheasant; whistler; wirecrown; wood duck; wood sawbill; wood sheldrake; zin-zin.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head*, glossy black; *forehead*, usually blackish brown or occasionally greyish; *crest*, of hair-like feathers, white, narrowly bordered with black. *thin* and *fan-shaped*; *neck*, glossy black; *bill*, black shorter than head, *nail* across entire tip; edges of both mandibles with blunt "teeth," not inclined backwards as in other mergansers, narrow, nearly cylindrical, hooked, *nostril* in basal third (fig. 53); *eye*, yellow. *Body.* *Foreback*, glossy black; *hindback* and *rump*, dark brown; *scapulars*, glossy black; *chest* and *breast*, white; *sides*, rufous brown, finely vermiculated with dusky, richer brown at rear; *belly*, white, mottled with dusky; two black bars from black foreback extending downwards diagonally into side of chest, the forward one some times extending faintly across chest to join its fellow; *feet*, dull yellowish olive to light brown, *webs* dusky. *Tail* and *upper coverts*, dark sooty brown; *under coverts*, greyish brown, speckled with whitish. *Wings.* *Lesser coverts*, dusky, tipped with grey; *middle coverts*, ashy grey;

greater coverts, outer ones, dusky, inner ones, white, basally black; *secondaries*, black outer web of inner ones broadly edged with white; *primaries*, dusky on outer webs and at tips, inner webs, paler; *tertials*, glossy black, striped with white; *lining*, silvery grey and whitish, mottled with dusky along forward edge; *axillars*, white.

ECLIPSE PLUMAGE: A moult into a partial eclipse plumage takes place in summer, when the male loses much of its brilliance, and somewhat resembles the female. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: In early autumn the adult male commences a continuous moult out of the partial eclipse plumage, in which it somewhat resembles the female, towards full winter plumage. The wing is as in winter plumage. In early stages a scattering of new, black feathers may be seen on *head* and *neck*, with a few white ones in the *crest*, which also begins to show traces of the black border; there are some new, black feathers on the *back* and *scapulars*, with a few rufous-brown ones on the *sides*. Later, the black-and-white *head* and *crest* pattern is apparent, though still somewhat mottled with brownish eclipse-feathers; the black and white bars in front of the wing begin to be noticeable; the *back* and *scapulars* are mostly black, and the *sides* mostly rufous brown, with a scattering of old grey-brown feathers. Most birds attain full winter plumage in early October.

ADULT FEMALE. *Head*, greyish brown, *crown* darker; *crest*, reddish brown, of hair-like feathers, sometimes whitish at rear; *neck*, brownish grey to sooty grey; *chin* and *throat*, whitish, usually speckled with dusky, occasionally solid sooty grey; *bill*, upper mandible, blackish with orange on edges, lower mandible, yellow or orange, bill same shape as in male; *nail*, black; *eye*, yellow brown to brown. *Body.* *Back* and *scapulars*, glossy brownish black; *rump*, blacker; *chest* and *sides*, grey, feathers of former tipped with whitish, and of latter with pale brown; *breast* and *belly*, white; *feet*, greenish to brownish, *webs* black. *Tail* and *upper coverts*, brownish black; *under coverts*, brownish grey, tipped with whitish. *Wings.* *Lesser* and *middle coverts*, dusky brown to ashy brown; *greater coverts*, dusky, tipped with white, outer ones blackish; *primaries*, as in male; *secondaries*, as in male but duller; *tertials*, glossy blackish, with white or ashy stripes; *lining* and *axillars*, as in male.

JUVENILE. In first plumage, sexes are alike and resemble adult female, except *back* browner, and *crest*, much less developed. *Bill* of both sexes, leaden grey above, and flesh coloured below; *nail*, light brown. This plumage is worn with but little change through first winter, spring and summer, and until November or December of their second year, when sexes differentiate rapidly. By second spring young males resemble adult males but are duller, the *crown*, *back* and *rump* being browner. By the following November or December, when about 2½ years old, fully adult plumage is achieved. *Wing of Male.* As in adult female but shows considerable variation in white of *greater coverts*; in some, the greater coverts show only a small spot of white on one or two feathers, while in others, the greater coverts show more white than those of the adult female, being mostly white with black tips; *lesser* and *middle coverts*, like those of juvenile female; *tertials*, dark brown instead of black, and with less pronounced white strips. By second spring, wing still resembles that of adult female. *Wing of Female.* As in adult female, but on the average, shows less white in the *greater coverts*; *lesser* and *middle coverts* are browner and darker; *tertials*, as in young male.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A small, black-backed, whitebreasted duck, with a black head and startling white crest. Chief distinguishing features

(a) hind toe with lobe, (b) typical merganser bill, narrow cylindrical and toothed, but short and black (fig. 53), (c) black head, with large compressed white crest, narrowly bordered with black.

The bill will distinguish it from the ducks of the other subfamilies, and its size and general appearance from the other mergansers.

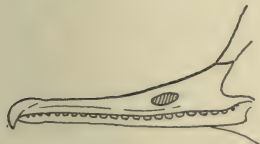


FIG. 53.—Bill of Hooded Merganser. (Compare with fig. 54.)

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions."

FEMALE. General effect: A small, brown-backed, white-breasted duck with a pronounced crest. Chief features (a) hind toe with lobe, (b) typical merganser bill, but short and dark (fig. 53).

The bill will separate it from the ducks of all the other subfamilies.

FIELD MARKS

ON THE WATER. The small male is readily recognized by its clearly defined black-and-white markings and its prominent, black-bordered, fan-shaped, white crest; the two vertical black bars in front of the folded wing are a good identifying mark. The male constantly raises and depresses its striking white crest. The drab female is recognized by its small size, thin crest, pointed black bill and white speculum. These mergansers and the Wood Duck are often found in association. In poor light, the male Wood Duck with crest ruffled may be mistaken for this species. The white head-patch of the Buffle-head sometimes causes confusion with this merganser, but the white sides and different build of the Buffle-head will separate.



IN FLIGHT. The white crest is depressed, and the head and neck appear like a little black stick, the white crest showing as a thin white streak; the head is held lowered at a moderate angle; the male is recognized by its black-and-white markings, the white breast and white wing-patch being very evident; the contrasting black-and-white stripings of the tertials form a good identifying mark. The brown female also shows a white breast and white wing-patch. The flight is swift and direct and probably more silent than that of any other species. These mergansers are usually found in pairs or in very small flocks. They rise from the water with great agility.

VOICE. A rough grunt resembling the syllables, *croo*, *crooh*, *crooh*. The female with young, if alarmed, utters a



guttural, chattering cry.

LIFE STORY

The Hooded Merganser, one of our most beautiful waterfowl, is exclusively a North American species. It is found across the continent anywhere in wooded timberlands surrounding ponds and streams, such localities being suited to its tree-nesting habits and shy, retiring disposition. The full-plumaged male, with its startling, flattened white crest, vies with the drake Wood Duck in beauty, and the two species are often found in association in the watery woodlands in which both build their nests and raise their broods. As a game bird it is little valued for, while generally quite plump and often reasonably palatable, it is small and, too frequently, strongly flavoured. It is a fresh water duck, seldom if ever visiting the sea coasts, wintering in the southern States and as far north as open water can be found.

The nests of this species are usually placed in cavities in trees, preferably located in the vicinity of water, but failing such cites, suitable trees will be sought even though they may be half a mile or more from the nearest pond or stream. Neither this nor any other tree-nesting duck ever transports any foreign material for lining the nests, but makes use of any debris or decaying chips that may already be there, and supplements it with down. Nesting as it does in the same localities as the Wood Duck, it often enters into conflict with that species over the possession of a nest; if combat ensues, as it frequently does, the Wood Duck is generally the victor. The dispute is sometimes amicably settled, however, as the eggs of the two species are often found in the same nest which is occupied by both ducks in turns. Regarding their nesting habits, Bent (1923) says: "The birds are probably mated when they arrive on their breeding grounds and soon begin the search for a suitable cavity for a nest, but they are not particular as to the size and shape of the cavity, the kind of a tree in which they find it, or the height from the ground; almost any hole or a hollow tree trunk will do, provided it is large enough to admit the bird and of the proper shape to hold and protect the eggs; even the open hollowed top of a stump or a fallen hollow log will do; and sometimes a hole in the ground is occupied."

The eggs may vary in number from 6 to 18, but the usual clutch is from 10 to 12; they are pure white in colour, quite round in shape and average 2.11 by 1.77 inches in size. Incubation is said to require 31 days, and is performed by the female alone, the males deserting the females at this time. The method by which the young of the tree-nesting ducks reach the ground is fully described in the "Life Story" of the American Golden-eye and of the Wood Duck, and need not be repeated here. The resourcefulness which is shown by a mother bird when her young are endangered is well illustrated in the following account by Samuels (1883): "When the female is suddenly surprised, while with her young in a stream or pond, she gives a guttural, chattering cry, when the whole brood dives and swims off under the water to the shore, where they conceal themselves in the aquatic herbage. While they are thus retreating, the mother simulating lameness, almost exactly like some of the shore

birds on the beach, flutters before the intruder, using every artifice to decoy him from the neighborhood of her young, when she takes wing and flies off. If, however, she has sufficient notice of the approach of a person before he reaches gunshot she swims rapidly off with her whole brood paddling behind her, until she turns a point or neck in the pond or stream where she happens to be, when, silently creeping into shore, she, with her brood, hides herself in the herbage on the land until the danger is past." (A kindred anecdote cited in the "Life Story" of the Pacific Eider makes an interesting contrast.)

"The movements of this bird upon the water are quick and active, and it swims rapidly and dives with great celerity. It is a beautiful object, and few birds surpass the male in attractiveness as he swims lightly along, elevating and depressing his beautiful crest. If suspicious, this species will sink the body until the water is almost level with the back, and sometimes disappears beneath the surface, apparently without effort, as if some unseen hand was pulling it down. When wounded it is one of the most difficult birds to secure, and it dives with such quickness, remains under water so long, and skulks and hides with so much skill that it is very apt to make its escape, and always tries the patience of its pursuer, whether dog or man, to the utmost. Their progress under water is extremely rapid, and the wings as well as the feet are used as means of propulsion, perhaps more dependence being placed upon the wings, and they may be said to fly beneath the surface" (Elliot, 1898).

The same writer says: "On the wing it is one of the swiftest ducks that fly, and it hurls itself through the air with almost the velocity of a bullet. Generally it proceeds in a direct line; but if it is alarmed at any object suddenly appearing before it, the course is changed with the swiftness of thought, and a detour made before again taking the first line of progression. Sometimes, without apparent reason, the course will be altered, and away it shoots at right angles to the first route; and again, it vacillates as though uncertain which way to take, or as if it was looking for a good feeding place. Usually five or six, but more frequently a pair, are seen flying together, and



often, on dull days when the lookout in a blind is somewhat relaxed, and the sportsman is consoling himself for lack of birds with possibly a nap or the lunch basket, the first intimation of the presence of a 'hairy crown' is given by one or more flashing close overhead with a startling whirr, and then as rapidly disappearing in the distance. . . . It rises from the water without any preliminary motions, and is on the wing at once, and in full flight, the pinions moving with a rapidity that almost creates a blur on either side of the body, the outline of the wing disappearing."

Though this merganser does eat a certain amount of vegetable matter its food comes mainly from the animal kingdom, and consists of small fishes, frogs, tadpoles, crawfish, beetles, caddis-fly larvae and the like. It is an expert diver and is adept at chasing and catching small fish, and obtains much of its food from the bottom of the fresh water ponds and streams which it inhabits.

American Merganser

Mergus merganser americanus

(mér-gus, mer-gán-ser, a-mer-i-kán-us)

Colour Plates Nos. 28 and 29. Downy Young No. 35.

SCIENTIFIC NAME

Mergus, Latin, meaning a diver; *merganser*, from Latin *mergus*, meaning a diver, and *anser*, meaning a goose; *americanus*, Latinized form, meaning of America.

COLLOQUIAL NAMES

IN GENERAL USE: Fish duck; sawbill. IN LOCAL USE: Bec-scie (meaning sawbill, sometimes misspelled "bexie"); big fish-duck; big pond-sheldrake (the term "sheldrake" has no reference to shells or molluscs, but means a drake dappled or spotted with white); big sawbill; big sheldrake; bracket; bracket sheldrake; breakhorn; Canadian canvasback; diver, dun-diver; fis; fisher; fisher duck; fisherman; fisherman duck; fishing duck; fresh-water sheldrake; gony; goosander; great lake sheldrake; harle; Irish canvasback; morocco-head; North Carolina sheldrake; pheasant; pied fisherman; pond sheldrake; river sheldrake; sawbuck; sheldrake; shelduck; shellbird; swamp sheldrake; spike; stud; tweezer; velvet breast; weaser; weaser sheldrake; wheezer; winter sheldrake; wood duck; woozer.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, metallic greenish black; crown feathers elongated but not forming noticeable crest; *lower neck*, white with salmon-pink tinge on *hindneck*; a narrow black line from foreback along back of neck, not reaching black of head; *bill* (fig. 54), red, dusky along ridge and tip, narrow, long and nearly cylindrical; *nail* across entire tip; *nostril* in middle third; edges of upper and lower mandibles with sharp pointed "teeth," inclined backwards; feathering of upper mandible extends forward about equal to that of lower mandible; inside of mouth, orange yellow; *eye*, dark brown. *Body. Back*, black; *hindback* and *rump*, ashy grey; *scapulars*, inner, black, outer, creamy or white; *chest*, *sides* and *breast*, white, tinted with pinkish salmon, which fades to

white soon after death; *flanks*, white, finely vermiculated with grey; *belly*, white, often mottled with grey; *feet*, red, *claws*, dusky. *Tail* and *upper coverts*, ashy grey; *under coverts*, white. *Wings*. *Lesser coverts*, those near edge of wing, black, those next to middle coverts, white; *middle coverts*, white; *greater coverts*, outer ones, black, inner ones, black with broad white tips; *secondaries*, outer ones, black, central ones, white, inner ones, white, narrowly margined with black (inner part of wing, mainly white, with single black bar, formed by black bases of greater coverts); *primaries*, dull brownish black, darker at tips and on outer webs; *tertials*, brownish black, outer ones, whitish margined with black; *lining*, white, dusky at edge of wing; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse starts in May and when at its climax, in August or September, the male closely resembles the female even to the extent of having developed a similar, though somewhat shorter crest; the colour of the head is cinnamon brown as in the female Red-breasted Merganser. The full-plumaged wing is renewed.

AUTUMN PLUMAGE: From the female-like plumage of the eclipse, the adult male in early autumn commences a moult towards winter plumage. The wing is as in winter plumage. In early stages new green feathers should be looked for on the *head*, which is mottled in appearance, green and brown feathers being intermingled, and some white ones on the *throat*. (A specimen at the Royal Ontario Museum of Zoology taken on October 26, at Lake Nippissing, Ont., shows a thick coating of dusky down on the cheeks, chin, throat, and foreneck, with which are mixed the remaining reddish feathers of the eclipse and some new green feathers of the winter plumage; other specimens, during the eclipse do not show this down, nor do birds during later stages of the autumn moult.) The new, black feathers of winter plumage begin to appear on the *back* and *inner scapulars*; similarly new white feathers can be seen on *neck* and *outer scapulars*; and a few vermiculated ones appear on *sides* at rear. As the moult progresses, *head* takes on more and more dark green feathers; *back* becomes mostly black, with a few old brown-grey feathers remaining; *outer scapulars* still retain some grey feathers; *sides* are mostly white, with a few old grey feathers. By December most adult males are in full winter plumage; backward birds will retain a few brownish feathers on *throat* and *back*.

ADULT FEMALE. *Head* and *upper neck*, reddish brown, sharply defined against colour of lower neck; *crown* and elongated *crest*, dark reddish brown; *chin*, *throat* and area at base of bill, white, often washed with reddish brown, occasionally entirely reddish brown; *lower neck*, ashy grey behind, and ashy, barred with whitish, in front; *bill*, dull red, dusky on ridge and *nail*; featheration of bill and position of *nostril* same as in male (fig. 54); *eye*, dull red or yellowish. *Body*. *Back*, *scapulars* and *rump*, ashy grey; *sides*, ashy, barred with whitish; *chest* and *breast*, white, faintly tinged with pinkish salmon, which fades to white soon after death; *belly*, white, sometimes mottled with grey; *feet*, dull reddish, with dusky *webs*. *Tail* and *upper coverts*, ashy grey; *under coverts*, white, mottled and flecked outwardly with ashy. *Wings*. *Lesser* and *middle coverts*, ashy grey; inner *greater coverts*, basally black, with broad white tips, and edged narrowly with dusky, outer ones, black; *secondaries*, with white *speculum*, outer *secondaries* black; *primaries*, brownish black, lighter on inner webs; *tertials*, grey, the innermost, darkest; *lining*, grey and white; *axillars*, white.

JUVENILE. The sexes are alike and similar to the adult female, except the lower *throat* is white instead of washed with brown; *crest*, shorter; *back*, brownish grey. During autumn and winter a prolonged moult takes place; *head* and *neck* of young male become mottled with black and *sides* vermiculated. The *tail* is renewed in spring but not the wings. By the second November the plumage is fully adult. (See features (c) and (d) below). *Wing of Both Sexes.* As in adult female. Some young males may be told by superior length of wing and by having the *tertials* longer, and the inner ones paler grey, than those of adult female, and boldly edged with dusky.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A very large duck, with black head and much white on wings and body. Chief distinguishing features (a) hind toe with lobe, (b) typical merganser bill, long, narrow, cylindrical and toothed, (c) nostril near middle of bill, (d) feathering on side of upper mandible extends forward about equal to feathering on side of lower mandible (fig. 54), (e) head without pronounced crest.

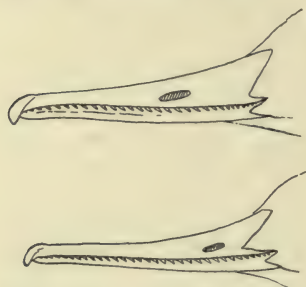


FIG. 54.—Above, bill of American Merganser. Below, bill of Red-breasted Merganser. The position of the nostril and the featheration at base of bill are important distinguishing features between these mergansers when in worn or juvenile plumage. (Compare also with fig. 53).

The typical merganser bill will distinguish this bird from the ducks of any other subfamily. In full plumage it is known from the Red-breasted Merganser by its lack of crest and lack of band around upper chest, and by its white chest and sides. In worn or in juvenile plumage, features (c) and (d) will provide means of distinguishing with certainty between the two species.

AUTUMN AND JUVENILE PLUMAGE: See "Descriptions." These juveniles can always be distinguished from the adults and juveniles of the Red-breasted Merganser by features (c) and (d) above.

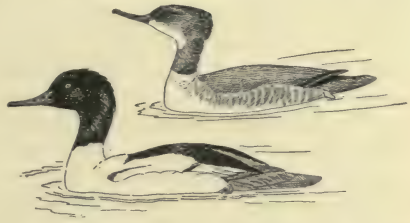
FEMALE. General effect: A large brown-headed, grey-backed, white-breasted duck. Chief features, (a), (b), (c) and (d) same as in male, (e) head with elongated crest, (f) large white throat-patch, distinctly outlined against red of cheek and neck, (g) red of upper neck, clearly defined against colour of lower neck.

The typical merganser bill will prevent confusion with the ducks of any other subfamily. In full plumage the clearly defined, white throat-patch and the sharp demarcation of the red and white on neck will separate from female Redbreasted Merganser. In worn or in juvenile plumage, features (c) and (d) will identify.

FIELD MARKS

ON THE WATER. The appearance of the male, when sitting, is that of a very large, rakish-looking duck, with much white on the body and a black head. The much smaller, grey-backed female shows the brown colour of head and upper neck sharply defined against the paler colour of lower neck. The

build and general contour of this loon-like duck should prevent confusion with any but the Red-breasted Merganser. Both species have pointed red bills which are noticeable at a considerable distance, but the male American lacks the crest and the red chest of the Red-breasted, and shows on the water as a much whiter bird. The female, if close enough, shows a much redder head and more crest than the female Red-breasted, but is sometimes difficult to separate from that species. Mergansers dive by making an upward and forward leap, frequently clearing the water in their diving lunge; they also possess the power of gradually sinking from sight like grebes. The male Golden-eye, which shows a corresponding amount of white, is easily separated by its build, which is shorter, chunkier, rounder of head and shorter of neck.



IN FLIGHT. The male shows more white of body and wings than any other duck; by this and by its loon-like flight, with its long, slender head and neck outstretched and its rakish outline, it is easily identified. The style of flight is swift, strong, and direct, in line formation, low over the water; in flight



the bill, head, neck, and body are all held perfectly horizontally. The male Red-breasted Merganser is similar but, in flight, does not show nearly as much white of body or wings. Lone females of the two species, when on the wing can be separated only when close enough to make visible the sharp line of demarcation between red and white on the neck of the American species; this feature is often noticeable at a surprising distance. Males are sometimes mistaken for Mallard drakes.

VOICE. A very silent bird, uttering an occasional hoarse croak if startled, *karr-karr*. Courtship voice of male, a quickly repeated purring note, *dorr-dorr* or *krr-krr*.

LIFE STORY

The handsome American Merganser, largest of its tribe, is well known throughout the continent of North America. It belongs to the same genus as the Red-breasted Merganser but is a distinct species; two other closely related varieties are found in the Old World. All mergansers are commonly known as "saw-bills," "fish ducks," "goosanders" or "sheldrakes," and this species is differentiated by being called "pond" sheldrake because it shows a greater preference for fresh water than does the Red-breasted Merganser and will remain inland in winter, where open water can be found, long after the other species has sought

the sea coasts. The term "sheldrake" has no reference to shells or molluscs, but means a drake dappled or spotted with white. These rapacious, fish-devouring ducks are not popular with fishermen, as they destroy countless millions of fish annually. Many of the fish that they feed upon, however, are themselves predatory and their destruction serves to help preserve the balance of nature. Nevertheless there is no doubt that the toll these ducks levy on game fish such as trout, salmon, bass and muskellunge is very heavy. Both the male and the female are strikingly beautiful birds and present a handsome appearance as they sit upon the water with the sunlight flashing on the gorgeous colours of their shining bodies. This merganser is unique among the ducks of this continent in that it is the only species the female of which is crested while the male is not. As table birds they are generally considered worthless, their predominantly fish diet imparting a strong flavour to their flesh.

Dr. Harrison F. Lewis kindly furnished the author with the following account of the economic status of the mergansers. "Whether this bird and the Red-breasted Merganser should be treated as harmful, neutral, or beneficial is one of those difficult questions that affords opportunity for never-ending discussion and marked difference of opinion. The objection to these birds comes chiefly from anglers and fish-culturists, who are often inclined to consider that the matter is settled by the evident fact that mergansers eat a good many trout. The angler wants the trout, including those that the merganser catches, so the angler dislikes the merganser and seeks its destruction. That is natural and simple. Unfortunately it is more simple than the actual situation.

"The first step that should be taken in dealing with any such question is a searching, accurate inquiry into the facts. This, to be effective, should be carried on by trained specialists, for some of the important facts are generally concealed and difficult to discover. The next step is sound reasoning from the facts obtained. Practically every man feels that his mental powers are fully equal to this task.

"There has not yet been nearly enough careful fact-finding about merganser, but there have been some excellent local investigations. The principal results are as follows: (a) Mergansers live chiefly on aquatic animal life, such as small fish, fish-eggs, insects, and crustacea. (b) They feed in both fresh and salt water and tend to take the food-forms most readily available in any locality. (c) In some localities they take no game fish; in others they take both game fish and predatory fish; in others they take only game fish. They are often very destructive to massed game fish in the rearing ponds at hatcheries.

"While conclusions to be drawn vary in detail from place to place, the following may, generally speaking, be considered warranted: (a) Where mergansers take no game fish it is difficult to show that they harm the interests of the angler. (b) Where mergansers take both game fish and predatory fish, their consumption of the latter may offset,

or more than offset, their direct effect on the former. (c) Where mergansers take only game fish it is because no other fish are available. In many such water areas the game fish, insufficiently preyed upon, develop populations more dense than the available food and oxygen can properly support, with the result that there are no large fish, but only an abundance of runts. Relief is not to be expected from angling, for the angler doesn't care to catch runts; the need is for more mergansers to thin out the stock of game fish and so enable the survivors to develop properly. (d) In some places at some times mergansers may be unduly plentiful and may have such an adverse effect on game fish that there is need of control measures. (e) One point to be kept in mind in evaluating mergansers is that they are extensively used as human food along the coast and in regions where pioneer conditions still prevail.

"In summary it may be said that the economic status of mergansers and the treatment to be accorded them are local matters, to be decided in each case only after a searching scientific study of the facts involved. Artificial conditions, such as those in fish-rearing ponds, present special problems, which are often most satisfactorily and economically solved by proper screening. In cases where a real need for reducing the numbers of mergansers is found, all operations should be carried on within the provisions of the statutes by which these birds are protected."

Of the swimming and diving habits of this bird, Bent (1923) says: "The American Merganser is a heavy-bodied bird and sometimes experiences considerable difficulty in rising from the water; if the circumstances are not favorable, it has to patter along the surface for a considerable distance; when flying off an island it often does the same thing unless it gets a good start from some high place, so that it can swoop downward. In swift water it has to rise downstream, as it can make no headway against the current; but it generally prefers to fly upstream if it can. . . . When well under way the flight of this species is strong, swift, and direct; on its breeding grounds it usually flies low, along the courses of rivers or about the shores of lakes, seldom rising above the tree tops; but on its migrations it flies in small flocks, high in the air, with great velocity. . . . This sheldrake is probably the most expert diver of its tribe, being built somewhat like a loon and approaching it in aquatic ability. It can sink quietly down into the water like a grebe or dive quickly with a forward curving plunge, clearing the water for a foot or more as it does so. It swims swiftly on the surface, but can attain even higher speed below it, where few fish can escape it. . . . The rapidity with which this species can dive from the air is remarkable. While in full flight it plunges into the water, swims below the surface for a distance and then suddenly emerges and continues its flight."

Of its behavior on land, Millais (1913) says: "The walk is very heavy and rolling, and the feet are placed on the ground deliberately whilst the bill is pointed downward, and each step taken as if the bird was afraid of tripping or falling. They seldom go more than a yard or two from the water's edge, but run quite swiftly for a few yards if sud-

denly surprised. In winter, it is a very rare event to see goosanders ashore, but in spring they often leave the water, and will spend hours sleeping and preening on some small island or point of land. No birds are more industrious in their toilet than the mergansers in spring, and most of their time, when not feeding, flying or sleeping, is spent in polishing up their plumage and bathing."

These mergansers are primarily fish eaters though to a lesser extent they also feed on various molluscs, crustaceans, water insects, larvae, and certain aquatic plants. Fishes make up the bulk of their food and they are voracious feeders, pursuing and catching the fastest of the finny tribe. When feeding in flocks they may be seen rushing along the surface, chasing schools of fish with much diving and splashing, the hindmost ones of the flock flying out of the water to land in front of the flock and being succeeded in turn by the others. Audubon says: "I have found fishes in its stomach 7 inches in length, and of smaller kinds so many as to weigh more than half a pound. Digestion takes place with great rapidity, insomuch that some which I have fed in captivity devoured more than two dozen of fishes about 4 inches in length, four times daily, and yet always seemed desirous of more." (At this rate of consumption each bird would eat 35,000 fishes a year!)

The following description of the courtship of this species is condensed from an account by Townsend (1916): A group of five or six male mergansers may be seen swimming energetically back and forth by three or four passive females. Sometimes the drakes swim in a compact mass or in a file for six or seven yards or even further, and then each turns abruptly and swims back. Again they swim in and out among each other, and every now and then one with swelling breast and slightly raised wings spurts ahead at great speed by himself or in the pursuit of a rival. The birds suggest swift motor boats by the waves which curl up on either side, and again suggest polo ponies, as one in rapid course pushes sidewise against a rival, in order to keep him away from the object of the quest. They frequently strike at each other with



their bills, and I have seen two splendid drakes rise up in the water breast to breast, and, amid a great splashing, during which it was impossible to see details, fight like gamecocks. The pursuit is varied by sudden, momentary dives and much splashing of water.

The smooth, iridescent green heads, the brilliant carmine bills, the snowy white of flanks and the red feet make a wonderful colour effect. The delicate salmon-yellow tint of the breast is a coloration of which the male is deservedly proud. He frequently raises himself up almost on his tail and reveals this colour, in the same way that the eider displays his jet-black shield. Most of the time he keeps his tail cocked up and spread, so that it shows from behind a white centre and blue border. Now he points his bill up to the zenith, again he bows or bobs his head nervously, and from time to time he emits a quickly repeated purring note, *dorr-dorr* or *krr-krr*. The most surprising part of the performance is the spurt of water fully three or four feet long which every now and then is sent backward into the air by the powerful kick of the drake's foot.

During all this time the female swims about unconcernedly, merely keeping out of the way of the ardent and belligerent males. At last, however, she succumbs to the captivating display and submerges herself so that only a small part of her body with a bit of the crest appear above the water. In this position she swims slowly beside or after her mate, sometimes even touching him with her bill. Later she remains motionless, flattens herself still more, the crest disappearing and she sinks so that only a line like that made by a board floating on the water is seen. The drake slowly swims around her several times, twitching his head and neck, picking at the water, his own feathers and at the female before he mounts and completely submerges her holding tightly to her neck with his bill. Then she bathes herself, washes the water vigorously through her feathers and flaps her wings; the drake stretches himself and flaps his wings likewise. From the beginning of submergence by the female the process is the same in all the duck family that he (Townsend) observed.

For a long time there was a diversity of opinion as to whether the American Merganser nested in trees or on the ground. As a matter of fact it does both. In localities where suitable sites off the ground, such as holes in trees or cliffs are to be found, it will choose and apparently prefer such places, but where these are not available it will build its nest on the ground. The number of eggs varies from 6 to 17 but is usually between 9 and 12, the average size being 2.53 by 1.77 inches. The eggs are very pale buff or ivory yellow in colour and the shell is exceptionally thick and strong. Incubation requires 28 days and is performed by the female alone; the males desert the females at this time, leaving family cares entirely to the mother.

While it has been reported that the young of the tree-nesting ducks are transported to the ground by the mother, in her bill, between her feet or on her back, the method that has been witnessed and carefully re-

corded is that of the youngsters jumping out of the nest at the call of the mother duck from the ground or water below the nest. Bent quotes several instances in which the young of this species have been seen tumbling out of their nest high above the ground, but as the method has been fully described in the "Life Story" of the American Golden-eye, and it differs in no essential from that account, it will not be repeated here. The same writer (1923) says: "After a day or two of rest in the nest, probably longer in tree nests than in those on the ground, the young have dried off their down and gained sufficient strength to take to the water, where they are very precocious. The downy young are very handsome and attractive. It is a beautiful sight to see a female merganser swimming in the clear calm water of some mountain lake or wilderness stream, where the mirrored reflections of picturesque scenery and forest trees make a splendid setting for the picture of a swiftly gliding, graceful duck followed by a procession of pretty little balls of down, with perhaps one or two of them riding on her back. If danger threatens she quickens her pace, but the little fellows are good swimmers and keep right at her heels; even if she dives they can follow her under water, working their little paddles vigorously and darting along like so many fish. If too hard pressed she rises and flaps along the surface, half flying; they can almost keep up with her at this pace, for they can run along the surface as fast as we can paddle our canoe. They soon become exhausted with some exertion, so she leads them into some sheltered cove, where they can run up on the shore and hide in the grass, or even up into the thick woods, where it is almost hopeless to hunt for them; it is surprising to see how quickly the young and even the mother bird can disappear."

In the spring these hardy birds are the very first of our waterfowl to start on the northward migration. They follow the retreat of winter and by March and April are well on their way to their summer breeding range, which extends across the northern portion of the entire continent and well up into the sub-arctic regions. In autumn the months of greatest movement are October and November, but the birds linger on their way, and remain as near to their breeding grounds as open water can be found. They winter in large numbers on the Great Lakes and all the larger inland bodies of water, and are to be found on both coasts from far north to the Southern States.

Red-Breasted Merganser

Mergus serrator
(mér-gus, ser-á-tor)

Colour Plates Nos. 28 and 29. Downy Young No. 35.

SCIENTIFIC NAME

Mergus, Latin, meaning a diver; *serrator*, Latin, meaning a sawyer (referring to the so-called "teeth").

COLLOQUIAL NAMES

IN GENERAL USE: Fish duck; sawbill. IN LOCAL USE: Bec-scie (meaning saw-bill, sometimes misspelled "bexie"); bec-scie de mer (sea sawbill); common saw-bill; common sheldrake (the term sheldrake has no reference to shells or molluscs, but means a drake dappled or spotted with white); diver; fis; fisher; fisher duck; fisherman; fisherman duck; fishing duck; fuzzyhead; garbill; garbill duck; hairycrown; hairy-crowned fisherman; hairyhead; Indian sheldrake; jack; Long Island sheldrake; Mississippi buck; pheasant; pheasant sheldrake; pied sheldrake; red-breasted fish-duck; robin; salt-water sheldrake; sea bec-scie; sea diver; sea sawbill; sea-robin; sheldrake; shelduck; shellbird; Spanish drake; spring buck; spring sheldrake; stud-duck; whistler.

DESCRIPTION

ADULT MALE. WINTER PLUMAGE: *Head* and *upper neck*, black, glossed with green on side of head; *neck*, with white collar, incomplete behind; *lower neck*, reddish brown mottled with black; *hindneck*, with black stripe from black head to upper back; *crest*, black, double-pointed and scraggly, of very narrow feathers; *bill* (fig. 54), carmine red, dusky along ridge, narrow, long and nearly cylindrical; *nail*, across entire tip, black; *nostril*, in basal third; edges of upper and lower mandibles with sharp-pointed "teeth" sloping backward; feathering of upper mandible extends forward to a sharp angle and further forward than that of lower mandible; inside of mouth, orange yellow; *eye*, deep red. *Body.* *Foreback*, black; *hindback* and *rump*, brownish grey, finely barred and speckled with black; *scapulars*, inner ones black, outer ones white, some marked with black; *upper chest*, reddish brown, mottled with black; *sides*, white, finely vermiculated with black; a group of black-and-white lengthened-feathers on side cover bend of folded wing, and show as a series of black and white stripes or spots; *breast*, white, with salmon-pink tinge which fades to white shortly after death; *belly*, white, sometimes faintly marked with dusky; *feet*, red. *Tail*, ashy grey, outer webs of outer feathers flecked with white; *upper coverts*, light grey, barred with black; *under coverts*, white, longer ones faintly flecked with grey at tips. *Wings.* *Lesser coverts*, those near edge of wing, black or brownish black, others, white; *middle coverts*, white; *greater coverts*, basally black, with broad white tips, outer ones black; *secondaries*, white, basally black, outer ones black; long inner secondaries, white, narrowly margined with black on outer webs; (black bases of greater coverts and secondaries show as two narrow diagonal black lines on folded wing); *primaries*, slaty brown, darker at tips and on outer webs; *tertials*, white, with black margins on outer webs, inner tertials black; *lining*, brownish grey and white; *axillars*, white.

ECLIPSE PLUMAGE: The moult into eclipse plumage commences in spring and is complete in August, the male then closely resembles the female except that the wing retains the male pattern.

AUTUMN PLUMAGE: In early autumn the adult male commences a moult out of the female-like eclipse plumage towards full winter dress. The wing is as in winter plumage. In the first stages, new green feathers can be seen on the *head*, and a few white ones on the *neck*. (A specimen at the Royal Ontario Museum of Zoology taken on October 19, 1932, at Lake Francis, Man., shows a coating of dusky down on areas of the head, as described under American Merganser). The reddish-brown *chest-feathers* with their dark markings begin to appear; new black feathers are sprinkled on the brownish *back*, and white ones appear on the outer *scapulars*; on the *sides* many vermiculated winter feathers are noticeable. In later autumn the *head-pattern* of the winter male becomes apparent, but the green *head* and white *neck-ring* still include some old brownish feathers; the *chest* markings are well developed; the back is black or brownish black, but lacks the sheen of full winter plumage. The long black-and-white *side-feathers* which overlap the bend of the wing can now be seen, and only a few old eclipse-feathers persist on the *sides*. By early December, almost full winter plumage has been attained, backward birds retaining a few brownish feathers on *head*, *neck* and *back*.

ADULT FEMALE. *Head* and *neck* (except foreneck), cinnamon brown; *chin*, *throat* and *foreneck*, whitish, shading into brown of neck; *crown*, with thin double-pointed crest, dark greyish brown; an indistinct darker brown line through eye; *bill*, dull red, featheration on bill and position of *nostril* same as in male (fig. 54); *eye*, red, or straw colour. *Body.* *Back*, *rump* and *sides*, brownish grey; *scapulars*, brownish grey, longer ones blackish brown; *chest*, greyish white; *breast*, white; *belly*, greyish; *feet*, same as those of male, but duller. *Tail*, ashy brown; *upper coverts*, brownish grey; *under coverts*, white. *Wings.* *Lesser* and *middle coverts*, brownish grey; *greater coverts*, basally black, with broad white tips, outer ones black; *secondaries*, basally black, with broad white *speculum*, outer ones black; black of greater coverts forming a black bar across white wing-patch; *primaries* and *tertials*, brownish grey, lighter on inner webs; *lining*, brownish grey and white; *axillars*, white.

JUVENILE. In autumn the sexes are alike and resemble the adult female but have a shorter *crest*. In December sexes begin to differentiate and black feathers appear on *head*, *neck* and *scapulars* of young male. Later, the adult markings of *chest* and *sides* begin to appear and young males are easy to identify. (See features (c) and (d) below.) In late spring young males pass into the eclipse and the fully adult plumage is achieved by second November. *Wing* of *Both Sexes*. See juvenile American Merganser.

SPECIMEN IDENTIFICATION

MALE. WINTER PLUMAGE: General effect: A large, dark-backed, white-breasted duck, with crested, black head. Chief distinguishing features (a) hind toe with lobe, (b) typical merganser bill, long, narrow, cylindrical and toothed, (c) nostril near base of bill, (d) feathering on upper mandible extends forward to a sharp angle and forward of the feathering on the lower mandible (fig. 54), (e) dark head, with straggly, double-pointed crest, (f) white collar and reddish band, spotted with black, across upper-chest.

The typical merganser bill will distinguish the male from the ducks of any other subfamily. In full plumage this duck is known from the American Merganser by its straggly crest, white collar and reddish upper-chest, and by its dark, vermiculated sides. In worn or in immature plumage features (c) and (d) will provide positive identification.

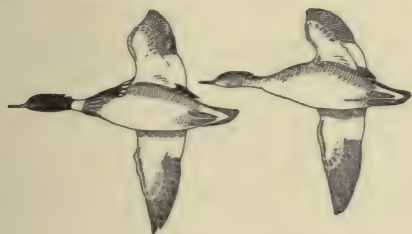
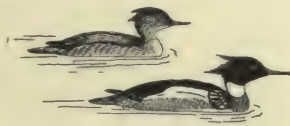
AUTUMN AND JUVENILE PLUMAGE: Juveniles can always be distinguished from the adults and juveniles of the American Merganser by features (c) and (d) above. See "Descriptions."

FEMALE. General effect: A small, brown-headed, grey-backed, white-breasted duck. Chief features, (a), (b), (c) and (d) same as in male, (e) brownish head, with straggly double-pointed crest, (f) brown of head merges imperceptibly into whitish foreneck.

The typical merganser bill will separate the female from all ducks of the other subfamilies. In full plumage it is known from the female American Merganser by its less clearly defined white chin-patch, its lack of sharp demarcation between colours of head and neck and by having a straggly *double* crest. In worn or in immature plumage features (c) and (d) will identify.

FIELD MARKS

ON THE WATER. The appearance of the male, when sitting, is that of a large, clipper-built duck; the black head, with straggly crest, is separated from the brown chest by a distinct white collar. Males are best recognized by their slim, rakish contour, long thin head and sharp red bill. They dive with the agility of grebes and in outline of head and body resemble loons; when they are about to dive the crest is always flattened down. The general appearance is similar to that of the American Merganser but in that species the male lacks the crest, and has solid white chest and sides. The drab Red-breasted female shows less crest than the female American, has a paler brown head, the brown blending into the white of the neck instead of being clearly defined as in the other species.



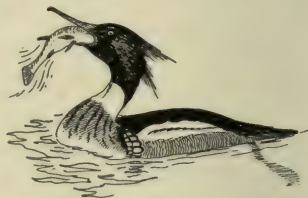
IN FLIGHT. The appearance of the male, on the wing, is best described by comparison with the American Merganser; it has the same style of flight but can be told from that species by showing much less white of wing and body; the reddish-brown chest-band is easily seen. The female is very like the female American, but the clearly-

defined white neck-line of the latter shows up remarkably in flight and serves to distinguish it.

VOICE. A very silent bird, uttering an occasional hoarse croak. The courtship voice of the male is a rough double note, *da-ah*; the female responds with a rasping croak; the voice of the female with young is a low, distinct but husky, *kha-kha-kha*. Courtship voice of drake is "a thin, rasping, metallic sound, with a timbre something like that of the American Golden-eye's 'peep-peep,' but with less volume. Audible only a short distance. Unequally divided into 2 or 3 parts, as — —, or — — —. Sometimes the last part is audible when the short note is not." (From field notes of Dr. Harrison F. Lewis.)

LIFE STORY

The Red-breasted Merganser is a common species throughout the northern portions of Europe, Asia and America. Both the male and the female are exceptionally beautiful birds and from the esthetic point of view their value is high. But as game birds they are valueless; their flesh is rank, tough, and unpalatable. Probably the only place where they are regularly hunted is on the coast of New England and eastern Canada and there probably only by those who hunt "coots" and relish their stew. As the merganser population of this continent consumes hundreds of millions of fishes annually, fishermen love not this voracious enemy of the finny tribe. They see all that is sinister in its malevolent red eye, and wicked red bill, with its rows of needle-sharp teeth designed to ensure that no fish shall escape the voyage into the bloody gullet which has already welcomed so many thousands of their kind. The fisherman's view, however, naturally tends to be biased. Dr. Harrison F. Lewis sent the author a brief account of the economic status of the mergansers which is included in the "Life Story" of the American Merganser, and to which the reader is referred.

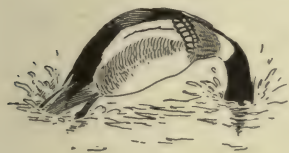


The Red-breasted Merganser, unlike the two other mergansers, always builds its nest upon the ground. The nest is usually well concealed under dwarf spruces, firs, or willows, or among the roots of trees, or a pile of driftwood; it consists of a hollow in the ground often profusely lined with the grey down from the mother's breast. When the set of eggs is complete, a thick blanket of down mixed with rubbish is used to cover the eggs during the mother's absence. The number of eggs may vary from 8 to 16, though the usual number is from 8 to 10. The average size of the eggs is 2.54 by 1.77 inches, and the colour is of varying shades of olive buff. The period of incubation lasts from 26 to 28 days and is performed by the female alone. The young are active from a few hours after hatching and are able to wriggle over the ground in a prostrate manner. They are soon strong enough to run around and climb easily onto the mother's back.

It is unusual for the drake of any of the ducks to take part in the raising of the young, but of this species Townsend (in Bent, 1923) says: "Both parents are assiduous in caring for the young. The young mergansers are carefully fed and guarded by their parents, and the family group keeps together until the young are fully grown. At the slightest sign of danger the young conceal themselves under the bushes and among the reeds of the banks of the river or pond, while the adults do their best to entice the intruder away. When suddenly disturbed in the open the young are able to make their way over the surface of the water with surprising rapidity by the combined action of the wings and legs. The noise of such a flight often confuses the enemy. On open shores I have known the young to flee from the approaching canoe, creep ashore, and, trust-

ing to their protecting coloring, crouch motionless among the rocks and small plants." (Among the ducks the male Ruddy Duck always assists in family cares, and the male Cinnamon Teal, occasionally, but none of the others is recorded as doing so except the male of this species.)

The courtship of this merganser, condensed from an account by the same writer (in Bent, 1923), is as follows: The nuptial performance is always at its best when several drakes are displaying their charms of movement, voice, and plumage before a single duck, and each vies with the other in the ardor of the courtship. The drake begins by stretching up his long neck so that the white ring is much broadened, and the metallic green head, with its long crest and its narrow red bill, makes a conspicuous object. At once the bill is opened wide and the whole bird



stiffly bobs or teeters, as if on a pivot, in such a way the breast and the lower part of the neck are immersed, while the tail and posterior part of the body swing upward. All the motions are stiffly executed, and suggest a formal but ungraceful courtesy. The bobbing up of the stern of the male is the more conspicuous as the wings are then apparently

slightly arched upwards, so that the white secondary feathers are very prominent. The drakes, in their eagerness, often rush through the water with slightly opened wings, making the water foam about them. Again they rise in the water with wings close to the side until they almost seem to stand on tip-toe.

The song, emitted when the bill is opened, is a difficult one to describe but is easily recognized when once heard and remains long in the memory. It is a loud, rough, and purring, slightly double note, like *da-ah*, but insusceptible of proper expression by syllables. The performance is repeated at frequent or infrequent intervals, depending on the ardor and number of the suitors, and, no doubt, on the attitude of the modestly dressed lady. Although the female merganser may remain passive and coyly indifferent, as is the habit of her sex, she sometimes responds by a bobbing which is similar to that of the male, but of considerably less range. She emits a single note at this time, somewhat louder than that of the male and of a different quality, being decidedly rasping. When the female responds in this manner she appears to be very excited. The ardor of the drakes is correspondingly increased, if one may judge by the frequent repetition of the love antics and notes, and by the fact that they crowd about the duck. Every now and then she darts out her neck and dashes at the ring of suitors, just as the female English sparrow does under similar circumstances.

Of its behaviour, Townsend (Bent, 1923) says: "Rising from the water or ground is indeed always a laborious process, but especially so in calm weather, when there is no wind to oppose its airplanes. There is a noisy flapping of the wings and a strenuous pushing away of the water or sand with the feet for some distance before the surface can be

cleared. A pair that I disturbed from the beach on a calm day showed the marks of their feet for 29 yards before they succeeded in getting away from the sand. Once on the wing their flight is noiseless and is generally close to the water, differing in this way from that of the Golden-eye which frequents the same shore, but which usually rises to a considerable height. When flying in pairs in the spring, the female generally precedes. It is a rapid swimmer and perfectly at home in the roughest water. As a diver the bird is truly an expert, and it disappears under water with wings close to its sides, making use of its powerful feet alone except on rare occasions when its wings are also brought into play. At times it leaps clear of the surface, describes a graceful arc and enters the water like a curved arrow, while at other times it disappears with scarcely a sign of effort. It often swims with its head and neck stretched out in front, as if it were swimming the water and straining it with its serrated bill for food. Again it advances with the head, all but the crest, below the surface apparently on the lookout for fish, and, at such times, it is constantly diving. At the moment of diving the crest is flattened down; when the birds swim before a strong wind the crests often blow up and over the head. On the land the Red-breasted Merganser is an awkward walker. It often rests flat on its belly or stands up with its body at an angle of 45 degrees. Again, it stands with its body parallel with the ground like an ordinary duck."

Though they do to a certain extent feed on various molluscs, crustaceans, and aquatic insects, the principal food is fish. It is an unforgettable sight to see a flock of these voracious birds feeding on a shoal of fish. The entire flock rushes along the surface of the water, diving and splashing continuously. Those at the rear, in their eagerness, rise and fly over the rest of the flock, landing in the water ahead, repeating this process constantly during the feeding. Unhappy and short is the life of the fry when attacked by a flock of these ravenous saw-bills. Allan Brooks (1934) says: "The Red-breasted Merganser is much more maritime than the larger species [the American Merganser] and at the proper season attends the spawning of the herring



schools as its chief object in life. As soon as the wireless of the sea fowl tells of the spawning in some bay, all the mergansers are headed for that locality until thousands are congested above the doomed fish. To see the turmoil of sea birds on such occasions is to wonder that any of the herring or their eggs survive after the first onslaught. Gulls generally are the first to locate the feast. Mergansers are soon on the spot, followed by murre, guillemots, and three species of loons; grebes . . . and cormorants of several species are the last to arrive. To see the large loons arriving, flying straight and swift, and hurling themselves into the melee, causes one to wonder that birds as well as herring are not killed."

In spring the migration north is much extended; it starts in March and April but it is not until the end of May that they have all left their winter haunts. The summer is spent on a breeding range that extends across the continent, but on the whole is more northerly than that of the American Merganser. In autumn the months of greatest movement are October and November, when huge flocks head south. The large flocks are usually in the brown dress of the female, but they are not all females, as at this time the juveniles, as well as the adult males, still partly in their eclipse plumage, closely resemble the females. Winter is spent on the Atlantic coast from Maine south, on the Gulf Coast and on the Pacific south from British Columbia. Certain numbers winter on the Great Lakes but there they are not as plentiful as the American Merganser.

RUDDY AND MASKED DUCKS

Subfamily *Erismaturinae*

(*Oxyurinae*, of Peters)

Ruddy Duck

Erismatura jamaicensis rubida

(*Oxyura jamaicensis rubida*, of Peters)

(e-ris-ma-tú-ra, ja-ma-kén-sis, rú-bi da; ox-i-ú-ra)

Colour Plate No. 30. Downy Young No. 35.

SCIENTIFIC NAME

Erismatura, from Greek, *ereisma*, meaning a stay or prop, and *oura*, meaning a tail (referring to the stiffened tail); *jamaicensis*, Latinised form, meaning of or pertaining to Jamaica (whence this bird was originally described as the Jamaica Shoveller, in 1785); *rubida*, Latin, meaning ruddy; *Oxyura*, from Greek *oxy*, meaning sharp, and *oura*, meaning a tail.

COLLOQUIAL NAMES

IN GENERAL USE: Butterball; ruddy. IN LOCAL USE: Biddy; blackjack; blatherskite (varied to blatherscoot, bladderscoot, bladderscoot); bluebill; bobbler; booby; booby coot; bristletail; broadbill; broadbill dipper; brown duck; brown teal; buck-ruddy;



FIG. 55.—Bill of Ruddy Duck.

bullneck; bumblebee-buzzer; bumblebee coot; butter-bowl; butterduck; canard roux (russet duck); chunk duck; coot; creek coot; dapper; daub duck; deaf duck; dicky; dinky; dipper; dipper duck; dip-tail diver; dopper; dumb-bird; dumpling duck; dummy duck; dunbird; fool duck; god-damn; goose teal; goose widgeon; greaser; hard head; hard-headed broadbill; hard tack; heavy-tailed duck; hickory head; Johnny Bull; leatherback; leather-breeches; light-wood-knot; little soldier; marteau; mud dipper; murre; muskrat duck; noddy paddy; paddywack; pintail; quilltail coot; rook; rudder bird; rudder duck; salt-water teal; shot pouch; shanty duck; sinker; sleeper; sleeping booby; sleepy broadbill; sleepy brother; sleepy coot; sleepy duck; sleepy-head; sleepy-jay; soldier duck; spatter; spatterer; spike-tail; spinetail; spoonbill; spoon-billed butterball; steelhead; sticktail; stiftail; stiff-tailed widgeon; stifty; stub-and-twist; stub-tail; tough-head; water-partridge; widgeon; widgeon coot; wiretail.

DESCRIPTION

ADULT MALE. SUMMER PLUMAGE, May to September: *Head*. Crown and nape, glossy black to below eye, sharply outlined against white cheek; chin, white; neck, short and thick, rich reddish chestnut; bill (fig. 55), bright blue, shorter than head, high at base, wide at tip, curved upwards; nail, small, narrow, and

with very sharp point; *eye*, yellowish brown to reddish brown; *eyelids*, greyish blue. *Body*. *Foreback, back, scapulars, chest, sides and rump*, rich reddish chestnut; *hindback*, dusky brown; *breast*, bright silvery white, some feathers of forebreast often with gilt tips, very dense plumage, peculiarly bristly in texture and scaly in appearance; *belly*, darker; *feet*, large, bluish grey, with dusky *webs* and *claws*; outermost *toe* longest. *Tail* (fig. 56), blackish brown, paler on outer webs, feathers stiff, narrow and pointed; *upper coverts*, dark chestnut, very short, barely covering bases of tail-feathers; *under coverts*, pure white, also very short. *Wings*. All *coverts*, dull dark brown, finely marked with lighter brown; *primaries, secondaries* and *tertials*, dull dark brown (under surface of flight-feathers, pale brown), secondaries and tertials finely speckled with lighter brown, secondaries sometimes tipped with whitish; *lining* and *axillars*, white, marked with greyish brown.

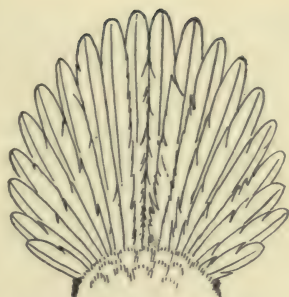


FIG. 56.—Tail of Ruddy Duck.

WINTER PLUMAGE, October to April: *Head*. *Crown* and *nape*, blackish brown, finely flecked with ashy brown; *cheek*, from below eye, and *chin*, white; *neck*, whitish to ashy; *bill*, dusky, shape, see summer plumage; *eye*, same as in summer. *Body*. *Back, scapulars* and *rump*, dark brown, faintly barred with flecks of ashy and sometimes somewhat variegated with patches of chestnut; *chest*, with broken bars of dark grey and silvery, often stained with rusty; *sides*, like back, but lighter, sometimes mottled with chestnut; *breast* and *belly*, same as in summer plumage; *feet*, same as in summer. *Tail*, same as in summer plumage; *upper coverts*, short, barely covering bases of tail-feathers, same as back; *under coverts*, white, also very short. *Wings*. Same as in summer plumage.

ECLIPSE PLUMAGE: There is no regular eclipse plumage. Instead there are the two plumages described above. The prenuptial moult in April and May produces the summer plumage and the postnuptial moult during August and September produces the winter plumage. (It is held by some that the "winter plumage" is a prolonged eclipse plumage.)

ADULT FEMALE. SUMMER AND WINTER PLUMAGE: *Head*. *Crown* to below eye, dark brown, speckled and barred with reddish brown or buffy; *cheek*, below eye, whitish, mottled with dusky brown, with a poorly defined dark stripe parallel to margin of crown, becoming more clearly defined in summer; *chin*, white; *neck*, short and thick; *foreneck*, greyish brown; *hindneck*, brownish black, wavy-barred with buffy brown; *bill*, dusky, shape same as in male; *eye*, yellowish brown to reddish brown. *Body*. *Back, scapulars* and *rump*, brownish black, faintly barred with buffy-brown flecks, more obscure in summer; *chest* and *sides*, marked with broken bars of dark brown and buffy brown; *breast* and *belly*, same as those of summer male; *feet*, same as those of male. *Tail*, same as that of summer male; *upper coverts*, short, brownish black, tipped with whitish or buffy; *under coverts*, short, white. *Wings*, same as those of summer male.

JUVENILE. In early autumn the sexes are alike and resemble the adult female but *breast* is more mottled with dusky; young females are smaller than young males, but otherwise indistinguishable. *Upperparts*, dark brown, indistinctly barred and dotted with buffy or reddish; *sides*, more distinctly barred with dusky and

greyish buff; *chest*, dusky, broadly tipped with buff; remainder of plumage, mottled with dusky, greyish and buffy tints. A more or less distinct dark stripe on the side of the face, but no clear white area on *cheeks*. This plumage is worn until January or February, when it becomes like that of the adult in winter; by the end of May an almost full summer-plumage is assumed by the male. *Wing of Both Sexes*. Same as those of adult.

SPECIMEN IDENTIFICATION

MALE. IN WINTER PLUMAGE: General effect: A small, dark-backed duck, with whitish underparts and long stiff tail. Chief distinguishing features (a) hind toe with lobe, (b) solidly-white cheeks and dark crown, (c) a spike-like tail, with practically no coverts.

IN SUMMER PLUMAGE: General effect: A small duck with reddish-chestnut upperparts, whitish breast and long stiff tail. Chief distinguishing features (a), (b), (c) as above, (d) a bright blue bill.

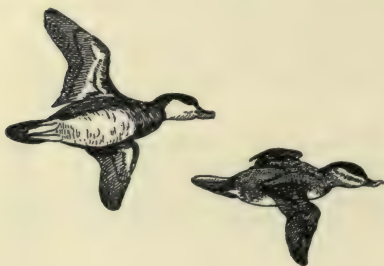
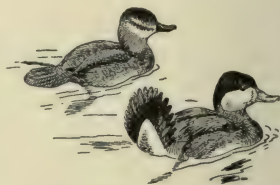
FEMALE. IN WINTER OR SUMMER PLUMAGE: General effect: A very small, blackish-brown duck, with a whitish breast and long tail. Chief features (a) hind toe with lobe, (b) dark crown and whitish, mottled cheek, (c) stiff tail with practically no coverts.

In winter garb the sexes are more likely to be confused with each other than with any other duck. The solid white cheeks of the male and its larger size will separate. In summer plumage the male can not easily be confused with any other duck. The Masked Duck, occasionally encountered in certain Eastern States, is very similar, but the male of that species lacks the white cheeks and has instead a black mask covering the forepart of the face; it also has a conspicuous white patch on the greater coverts. The female Masked Duck lacks the black mask, but has two black streaks on side of face, one through the eye and one from the base of bill; the white patch on the coverts, as in the male, is present but is smaller in area.

JUVENILE. See "Description."

FIELD MARKS

ON THE WATER. Whether in its bright summer plumage with its reddish-brown back, or in its drab, dark-brown winter-garb, the male Ruddy is instantly identified by the erect, fan-shaped tail, the pure white cheeks offset by the dark crown, and its chunky build. The female lacks the pure white cheeks of the male and does not carry the tail erect, but has the same unmistakable build and is the same colour as the male in winter plumage.



IN FLIGHT. In winter plumage, the short, solidly-brown wings, white cheeks, white breast, chunky build and rapid wing-beats will identify either sex. The red colour of the male will identify it in summer. The Ruddy rises from the water with extreme difficulty, and patters along the surface for a long distance before clearing, but once under way it is fast, has a jerky, uneven gait and flies with considerable noise of the wings. The flight appears tail-heavy.

VOICE. The courtship voice of the male is: *chuck-chuck-chuck-chuck-chur-r-r*; and *ip-ip-ip-ip-u-cluck, cluck*; and *tick, tick, tick, tickety, quo-ack*; also *chica, chica, chica, chica, quak*. Both sexes are otherwise silent.

LIFE STORY

The curious, sprightly, comical little Ruddy Duck is exclusively a North American species. On this continent it is widely scattered from our eastern to our western coasts. It is one of the most peculiar and distinctive of all ducks, and the subfamily to which it belongs has but little in common with the other groups of ducks.

To appreciate what a striking picture he makes, the male Ruddy should be seen at home on his breeding range, arrayed in all the glory of his brilliant summer plumage. "In the midst of a sea of tall, waving flags a quiet, sheltered pool reflects on its glassy surface the dark green of its surroundings, an appropriate setting for the little gem of bird life that floats gently on its surface, his back glowing with the rich, red brown of his nuptial attire, offset by the pure white of his cheeks, his black crown, and above all his wonderful bill of the brightest, living, glowing sky blue. He knows he is handsome as he glides smoothly along, without a ripple, his saucy sprigtail held erect or even pointed forward till it nearly meets his upturned head; he seems to strut like a miniature turkey gobbler" (Bent, 1925).

The courtship display of the Ruddy is a striking performance on the part of the male, and he probably outdoes most, if not all, of his kind in this respect. He seems to know that in his bright summer garb he is a handsome little fellow and shows himself off with obvious conceit. He swims round and about the female with his tail tilted forward until it almost touches his head. Now the head is stretched out to the full extent of the short little neck, now it is drawn close to the body. He continually slaps his bright blue bill against his red chest, which is puffed out like that of a pouter pigeon. While swimming about he continually utters his call, *chuck-chuck-chuck-chuck-chur-r-r*. The feathers over the eyes are puffed up into two swollen protuberances and his orbs gleam forth with what appear to be belligerent and baneful glances, but which to his intent must have a totally different significance. In another pose, with the bill pressed down on the chest feathers, the back puffed up and the tail under water, he seems to stand up and scoot over the surface at a surprising speed. Often, in doing his chin exercises, he pumps up a laboured *ip-ip-ip-ip-u-cluck, cluck*, almost as if choking. He kicks the water with both feet working together, making it spurt out behind him, and may utter another of his courtship calls, *tick, tick, tick, tickety, quo-ack*. The female, when impressed with the drake's perform-



Courtship of Ruddy Duck

ance, will often stretch forth her neck with the bill open as though in applause and may essay, but with indifferent success, to duplicate some of the male's antics. The attempt on the part of another male to "cut in" on his chosen partner is the signal for furious combat on and beneath the water, without cessation until the interloper is finally driven away. The ability of the male Ruddy Duck to puff out his chest, as described, is due to a large air-sac in his neck, which he inflates at will during his display performance.

For its nesting place the Ruddy Duck seeks prairie sloughs or wherever it can find the cover provided by thickly growing bulrushes, flags and tall reeds; in such surroundings the Ruddy conceals her nest in a manner which makes discovery difficult. The nest is a basket-like structure of materials from the surrounding vegetation and always cleverly matches its environment. It is built about eight inches above the level of the water and is firmly attached to the growing reeds, which are often arched over it for better concealment. Sometimes the nest is provided with a sloping pile of reeds down which the duck can slide into the water at the approach of danger; on reaching the water she slinks silently away like a grebe.

A great surprise is provided by the eggs of this species. The female, though one of the smallest of the ducks, weighing about one pound, lays enormous eggs, the average size of which is 2.45 by 1.79 inches. The Mallard and Canvas-back, ducks three times the size of the little Ruddy, lay substantially smaller eggs. A clutch of 14 eggs of the little Ruddy Duck, which are probably laid within a period of 15 days, weighs approximately three pounds, or about three times as much as the little mother herself! As many as 20 eggs have been found in one nest, though the usual number is from 6 to 10; when the number is large they are deposited in two or even three layers, the better for the tiny female to cover them. The eggs are rough and granular, have very thick shells, and vary considerably in shape; they are pure dull white or creamy white when first laid. The indications are that in the more southern portions of its range two broods may be raised in one season; this is unique among the ducks.

The male does not assist in the process of incubation, but, unlike most other ducks, which desert the female at this time, he remains close at hand. When the brood is hatched he assists in the care of the family until they are able to shift for themselves. It is a common sight to see a male, with tail erect and chest and throat puffed out, swimming at the head of a brood of newly hatched young in compact flock, while the female follows behind. It is said that



from infancy Ruddys are sullen, ferocious, bad-tempered birds, and from the day they are hatched will snap and peck viciously when captured. As might be expected from the size of the eggs, young Ruddys are very large ducklings. They are also very precocious, diving for their food on their first contact with the water; other species take their food from the

surface for several weeks. Usually when about half grown the young separate from their parents and fend for themselves.

The legs of the Ruddy are placed well to the rear of the body, and both young and adults are practically helpless on land, resembling grebes in this respect. They are able to waddle along for a few steps, but fall upon their breasts almost immediately and progress by shoving along in this prostrate position, pushing with both feet simultaneously. In contrast, and again resembling grebes, they are among the most active ducks in the water and possibly only the grebe can equal them in aquatic ability. They dive like a flash and have the peculiar power of sub-



The Ruddy walks on land with difficulty.

merging completely without any attempt at diving—they simply sink out of sight. When they are swimming under water, the wings are closed and both feet work simultaneously.

In its flight, swimming, and diving habits the Ruddy Duck more closely resembles the grebes than does any other American duck. Its small, rounded wings are hardly sufficient to raise its chunky little body off the water, except with the aid of its large, powerful feet, pattering



The Ruddy rising

along the surface for several yards. But, when well under way, it makes good progress in flight, though it flies usually close to the water and seldom rises to any great height in the air, even when migrating. It has a peculiar, uneven, jerky gait in flight by which it can be easily recognized at a long distance" (Bent, 1925). Ruddys generally fly in medium to large-sized flocks, their wings making considerable noise due to their rapid beats.

Most ducks have a postnuptial moult during the summer, known as the "eclipse," in which for a short while the drake assumes a plumage resembling that of the female. As might be expected of this so-different little duck, the Ruddy provides one of the few exceptions to this rule, and has instead two distinct plumages, one for the summer breeding season and one for the winter. A prenuptial moult in April and May produces the brilliant summer plumage of the male with the chestnut-coloured back and bright blue bill; a postnuptial moult from August to

October produces the drab winter plumage in which even the bill changes colour and the two sexes are much alike. On this continent the Old-squaw is the only other duck which has two such moults and distinct plumages for winter and summer. (Some ornithologists hold that the female-like winter plumage of the male Ruddy is really a prolonged eclipse plumage.)

The colloquial names of the various ducks are often quite descriptive; in no instance is this more true than in the case of the Ruddy Duck. The following very apt, complete, and accurate description of this duck is drawn from a selection of some of its many alternative names: It is a neat little duck (dapper; dinky), quite small, being about the size of a teal (partridge; teal) and very fat (butter; dumpling). It is of a red-dish colour (ruddy; brown) with a broad, blue, spoon-shaped bill (blue; broad; spoon) and a short, thick neck (bull). It has a peculiar, stiff, bristly tail of spikey, quill-like feathers (bristle; spike; spine; quill). Though it is found in the open waters and is a great diver (coot; diver) it loves the muddy ponds and creeks of the vicinity (pond; creek; mud). It is easily approached, being of a stupid, sleepy nature and seemingly deaf or inattentive (booby; deaf; dumb; sleepy). It rises from the water with great difficulty (splatterer), is not easy to kill due to the denseness of its feathers, and is altogether a tough little customer (hickory; steel; hard; tough; leather).

The food of the Ruddy Duck is nearly three-quarters vegetable. The stomach contents of 163 adults taken during nine months of the year (January, February and August excepted), from 31 States and 5 Canadian Provinces, showed the average diet to be approximately of the following percentages: pondweeds (various), 30; bulrushes, 16; other sedges, 3; muskgrass, 4; wild celery, 2; miscellaneous plant food, 17; total vegetable food, 72 per cent. Insects, 22; molluscs, 3; miscellaneous animal food, 3; total animal food, 28 per cent. Of the total stomach contents, gravel averaged 38 per cent.

With a diet which is so preponderantly vegetable, and in which shellfish represents such a small percentage, Ruddys, as might be expected, are delicious table birds. They are regular gourmands and it is said that at times they are found floundering on the water, helplessly fat. They decoy readily and are always popular with sportsmen.

In spring, by March or April, in various stages of its prenuptial moult, the Ruddy is on its way back to its summer breeding grounds. On its migration in autumn, usually in September, it follows the courses of the streams and lakes, flying low and in large flocks. The flights are made mainly early in the morning or during the dusk of the evening, and perhaps even during the night. In winter they may be found in large numbers on the Atlantic and Pacific coasts of the Southern States; here they gather in the shallower and more protected bays and estuaries, where they fatten and thrive on the abundance of choice duck foods so lavishly provided by nature in these chosen milder climes.

What an amazing list of achievements the Ruddy Duck can claim!

Even the conceited, pompous little drake should be satisfied with this record: (a) The male has two distinct plumages, one for summer and one for winter. (b) It has the most spectacular of all duck courtship-displays. (c) It has more local, alternative names than any other duck.

(d) The male is the only duck of its sex that invariably assists in the raising of the young. (e) It is the only species of duck that raises two broods in one season. (f) Except for some of the eiders and scoters, the tiny female lays the largest of duck's eggs. (g) The male is the only duck that possesses an inflatable air-sac in the neck. (h) The male is the only duck that carries the tail erect. (i) The male is the only duck that has a truly bright-blue bill. (j) Neither sex can walk on land. (k) They both are credited with the worst tempers imaginable. (l) It is rare for any female to be silent, but the female Ruddy is.



Masked Duck

Nomonyx dominicus
(no-mon-iks, do-min-i-kus)

Colour Plate No. 31.

SCIENTIFIC NAME

Nomonyx, from Greek, *nomos*, meaning law, order, and *onux*, meaning nail, i.e., nail of bill ordinary; *dominicus*, Latinized form, meaning of St. Domingo, an island republic in the West Indies.

COLLOQUIAL NAMES

None in North America.

DESCRIPTION

ADULT MALE. WINTER AND SUMMER PLUMAGE: *Head*, from bill to ear region, including *crown*, black; *hindhead* and *neck*, dark rusty cinnamon (from its black face it gains the name "masked"); some individuals have a white chin; *bill*, smaller than that of Ruddy Duck, pale blue, ridge and *nail*, black, lower mandible whitish or reddish white, tipped with black; *eye*, dark brown; *eyelids*,



FIG. 57.—Bill of Masked Duck

(Compare FIG. 55)

Body. *Back* and *scapulars*, dark rusty cinnamon, with conspicuous dusky or black feather-centres, giving a dark striped effect; *rump*, dark brown, marked with black, some feathers white-edged; *chest*, rusty cinnamon or brown, marked with black and reddish buff; *sides* and *upper breast*, rusty cinnamon or brown, marked with black; *lower breast* and *belly*, whitish, often stained with rusty; *feet*, outer side of tarsus and two outer toes, dark brown or black, inner side of tarsus, inner toe and *webs*, pale brown, spotted with black (outermost toe not longest, as in Ruddy Duck). *Tail*, blackish; *upper coverts*, black, barred and marked with white; *under coverts*, same as breast; *tail-coverts*, short, barely covering bases of tail-feathers. *Tail*, fan-shaped and of quill-like

feathers as in Ruddy Duck. *Wings*. *Lesser coverts*, brownish black; *middle coverts*, brownish black, tipped with white; inner *greater coverts*, brownish black, outer ones white; *primaries* and *tertials*, dark brown; *secondaries*, with white *speculum*, tipped with black; *lining*, deep brownish grey, with some light edges and tips; *axillars*, white.

ECLIPSE PLUMAGE: There is no eclipse plumage. It is possible that the Masked Duck loses its brilliant colouring during the post-nuptial moult in autumn, as does the Ruddy Duck.

ADULT FEMALE. *Head*. *Crown*, dark brown; *cheeks*, *chin* and *throat*, creamy to white, with two dark stripes on *cheek*, one through eye and one from base of bill to ear; *neck*, dark brown, feathers edged with buffy; *bill*, brown, with black tip; *eye*, same as that of male. *Body*. *Foreback*, same as neck; *back*, *scapulars* and *rump*, brownish black, feathers tipped and notched with buff; *breast*, whitish; *belly*, greyish buff, with brownish-grey bars to feathers; *chest* and *sides*, dusky, barred

and tipped with whitish; *feet*, same as those of male. *Tail*, brownish black; *upper coverts*, brownish black, lightly flecked with buff; *under coverts*, brownish buff. *Wings*. *Lesser coverts*, dark brown, very lightly sprinkled with buffy specks; *middle coverts*, same as lesser coverts, but outer ones white; *middle greater coverts*, white, others, dark brown; *primaries* and *secondaries*, dark brown, middle secondaries, white basally; *tertiaries*, dark brown; *lining*, pale brown; *axillars*, white.

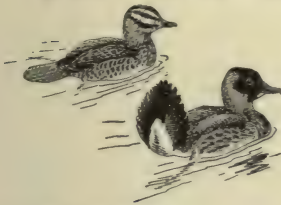
JUVENILE. In early autumn the sexes are alike and resemble adult female, but are more uniform *below*, lacking black markings and light edges. By spring young male resembles adult but black *mask* is mottled with whitish feathers, and *underparts* are pale whitish.

SPECIMEN IDENTIFICATION

ADULT MALE. General effect: A very small, rusty cinnamon-red duck, with a long tail. Chief distinguishing features (a) hind toe with lobe, (b) black mask to head, (c) spike-like tail-feathers, (d) white patch on wings.

ADULT FEMALE. General effect: A very small, brownish-black duck, with a long tail. Chief features (a) hind toe with lobe, (b) two black streaks on creamy cheeks, (c) and (d) as in male.

The Masked Duck occurs casually in certain eastern States, and closely resembles the Ruddy Duck.



JUVENILE. See "Description."

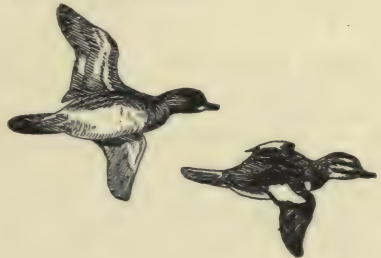
FIELD MARKS

Similar to Ruddy Duck and distinguished by markings as above.

LIFE STORY

This little duck, which derives its name "masked" from its black face, is very much like our own little Ruddy Duck. Though its habitat is no further removed than northern South America and the West Indies, it seldom visits this continent; and on account of its rarity it is of little immediate interest to our gunners and naturalists.

It has a spikey tail, which it carries in the same manner as the Ruddy Duck; in style of flight and grebe-like aquatic ability, it is the counterpart of the Ruddy; its eggs are of practically the same size, 2.48 by 1.80 inches, and its nesting habits are similar. It is a fat little duck and, in its native land, is much esteemed as a table bird.



TREE DUCKS

Subfamily *Dendrocygninae*

Black-Bellied Tree Duck

Dendrocygna autumnalis autumnalis
(den-dro-sig-na, aw-tum-nál-is)

Colour Plate No. 31. Downy Young No. 35.

SCIENTIFIC NAME

Dendrocygna, from Greek, *dendron*, meaning a tree, and *cygnus*, Latin, meaning a swan; *autumnalis*, Latin, meaning of the period of harvest, of autumn.

COLLOQUIAL NAMES

Autumnal tree duck; cornfield duck; long-legged duck; summer duck.

DESCRIPTION

ADULTS, BOTH SEXES. *Head.* Forehead and crown, cinnamon brown; sides of head, ashy grey; chin and throat, whitish; narrow whitish ring around eye; hind-head and hindneck, black; lower foreneck, pale cinnamon brown; eye, brown; bill, light red, orange above and around nostril; nail, light bluish. *Body.* Back, chest and upper breast, light cinnamon brown, scapulars, darker brown, with cinnamon edgings; rump, black; breast and sides, black, clearly defined against cinnamon brown of chest; belly, black, spotted with white; feet, pinkish white, clumsy, heavy, and long; craws, long. *Tail and upper coverts*, black; *under coverts*, white, spotted with black. *Wings.* Lesser coverts, pale brown; middle coverts, ashy white; greater coverts, ashy white to white; secondaries, black; primaries, basally white, terminally black, with outer webs of a few primaries white near tips, outer primary (see Glossary) all black; tertials, cinnamon brown; lining and axillars, black.

JUVENILE. During first autumn and winter the juvenile is somewhat like the adult, but the pattern is less distinct, the brown shades of the upperparts are replaced by paler brown; underparts, greyish buff, instead of brown and black as in the adult; bill, dusky; feet, dark reddish. Fully adult plumage is probably assumed after the first postnuptial moult during the following summer.

SPECIMEN IDENTIFICATION

See Fulvous Tree Duck.

FIELD MARKS

ON THE WATER OR IN FLIGHT.

The sexes are alike and are readily recognized by the cinnamon-brown upperparts, sharply contrasting black sides and breast and very long legs. These birds are frequently seen walking on land and, when alighting, they do so on land and then wade into the water; on alighting the neck is stretched down until the bill almost touches the toes. In flight they move in line, and the white wing-patches

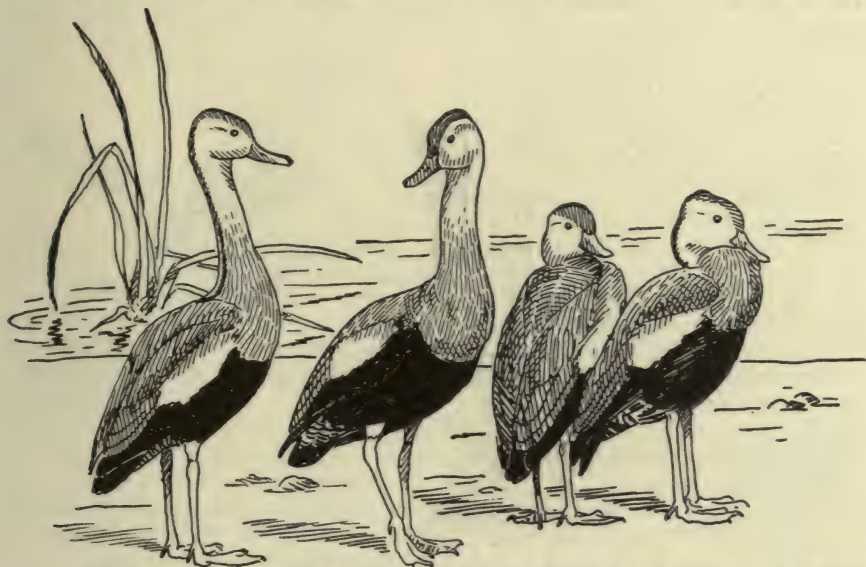


are conspicuous; the long feet trail behind the tail, and they present a most unduck-like appearance.

VOICE. A peculiar, shrill whistle, *pe-che-che-ne*.

LIFE STORY

The Black-bellied Tree Duck is abundant in Mexico where, on account of its habit of frequenting the cornfields, it is called by the natives "patos maizal," or "cornfield duck," and is said to do considerable damage feeding on the corn; it is also known as the "*pe-che-che-ne*" duck. It visits Texas but is rare in the rest of the United States and therefore of little interest to the majority of gunners or naturalists of North America. It is readily domesticated and is an excellent table bird.



"This duck perches with facility on the branches of trees, and when in the cornfields, upon the stalks, in order to reach the ears of corn. Large flocks of them spend the day on the bank of some secluded lagoon, densely bordered with woods or water flags, also sitting among the branches of trees, not often feeding or stirring about during the day. When upon the wing they constantly utter their peculiar whistle of *pe-che-che-ne*, from which they have received their name from the natives. . . . this species seldom alights in deep water, always preferring the shallow water edges, or the ground; the cause of this may be from the fear of the numerous alligators that usually infest the lagoons. When taken young, or the eggs hatched under the common barnyard hen, they become very domestic without being confined; they are very watchful during the night, and like the goose, give the alarm by their shrill whistle when any strange animal or person comes about the house. A

lady of my acquaintance possessed a pair which she said were as good as the best watchdog; I also had a pair which were equally as vigilant, and very docile" (Col. Grayson, quoted by Lawrence, 1874). Their long legs give them an odd look as they wander on land or wade in the water. On being surprised, they raise their long necks after the manner of geese. The flight is peculiar and characteristic; they fly low and in a line, their large wings with white bands presenting a striking aspect and giving the impression of a much larger bird.

The nests are placed in holes in trees, in forks of branches, or on the ground among rushes, reeds, and grass, often at considerable distances from water. The number of eggs varies from 12 to 16, and average in size 2.06 by 1.51 inches. They are white or creamy white in colour, some being glossy and finely pitted and others lacking in gloss. The nesting season is very much prolonged, and it is therefore possible that two broods may be raised in one season, as is claimed by some authorities though not confirmed by others. While the males are supposed to attend to their own affairs during the period of incubation, it would seem that they sometimes assist in the nesting duties, as male specimens have been shot in which the appearance of the breast-feathers indicated that they had been sitting on eggs.



Fulvous Tree Duck

Dendrocygna bicolor helva

(den-dro-sig-na, bi-co-lor, hél-va)

Colour Plate No. 31. Downy Young No. 35.

SCIENTIFIC NAME

Dendrocygna, from Greek, *dendron*, meaning a tree, and *cygnus*, Latin, meaning a swan; *bicolor*, Latin, meaning of two colours; *helva*, from Latin, *helvus*, meaning of the colour of honey.

COLLOQUIAL NAMES

IN GENERAL USE: Long-legged duck. IN LOCAL USE: Cornfield duck; Mexican

duck; Mexican squealer; Mexican wood-duck; squealer; summer duck; tee-kee; Yankee duck; yellow-bellied fiddler duck; wood duck.

DESCRIPTION

ADULTS, BOTH SEXES. *Head*, yellowish brown, darker on crown where it is more reddish; *chin* and *throat*, yellowish white; *hindneck*, with black stripe from crown to foreback; *neck*, with collar of white streaked with black, incomplete behind; *eye*, dark reddish brown to brown; *bill*, bluish black; *nail*, black, markedly hooked. *Body*. *Back* and *scapulars*, brownish black, the feathers broadly tipped with reddish brown and buffy; *rump*, black; *chest* and *breast*, buffy brown; *belly*, paler; *sides*, reddish buff, longer side-feathers, with broad, creamy stripe bordered below with dusky; *feet*, deep bluish grey, clumsy, heavy and long; *claws*, long, dark. *Tail*, brownish black; *upper* and *under coverts*, creamy. *Wings*. *Lesser coverts*, chocolate brown; rest of wing, both upper surface and *lining*, and the *axillars*, deep blackish brown.



JUVENILE. During first autumn and winter the juveniles are very similar to the adults, except colours are duller, *underparts* paler, *wing-coverts* paler brown, brown edging to *back-feathers* narrower, and upper *tail-coverts* tipped with brown. After the first postnuptial moult during the following summer, the plumage is, probably, fully adult.

SPECIMEN IDENTIFICATION

General effect: A brownish duck, with a very long neck, and long legs and feet. Chief distinguishing features (a) hind toe, without lobe, (b) bill, bluish black, (c) feet, deep bluish grey, (d) breast, buffy brown.

This duck can be confused only with the Black-bellied Tree duck; but the bill of that species is light red, feet pinkish white and breast black.

FIELD MARKS

ON THE WATER OR IN FLIGHT. The sexes are alike and are readily recognized by their tawny-brown colour and very long legs. On land their long legs give them an odd and characteristic appearance; they crowd together, crane their necks and look extremely tall. On the wing the feet extend past the tail in a most unduck-like manner. The flight is strong and goose-like, and the wing-beats are less rapid than those of the true ducks; the head and neck, and the tail and feet, droop below the level of the back. On alighting, the neck is stretched downward until the bill almost touches the toes.

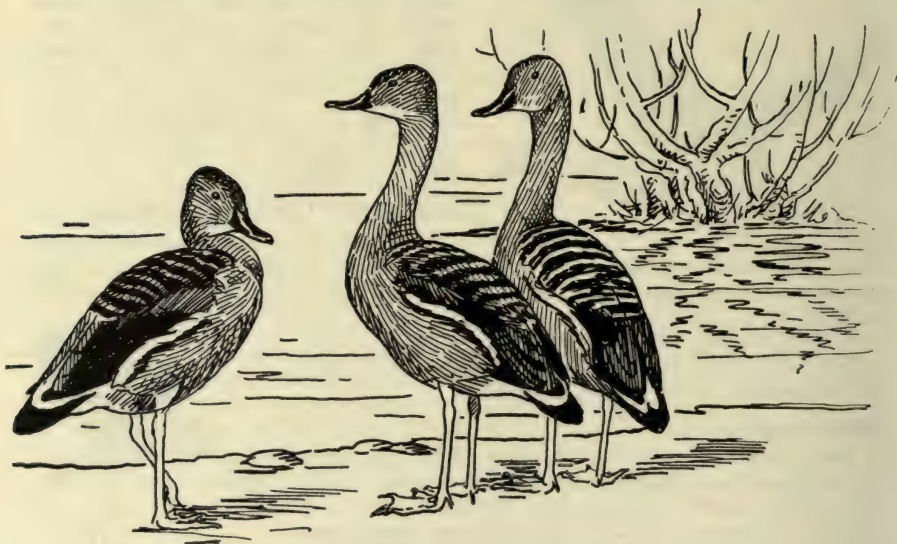
VOICE. A long, squealing whistle; a high, short-cut whistle; when rising from land or water, a clamour of whistling voices.



Alighting

LIFE STORY

The Fulvous Tree Duck is a medium-sized, long-legged, long-necked duck of somewhat goose-like appearance and habits. The term "fulvous" means deep yellow or tawny and refers to the colour of the bird. To the gunners of this continent it is known as the "fiddler duck" and to the natives of Mexico as "pato silvon" or "whistling duck." It has the most extraordinary range of all species of bird, being found in five widely separated "colonies": India, East Africa, southeastern South America, northern South America and southern United States and northern Mexico. It is of a shy, retiring disposition and very nocturnal in its feeding habits. As the majority migrate into Mexico before the commencement of the shooting season, these ducks are of little interest to the gunners of North America. In flight the long legs extend beyond the tail and the birds present a most unduck-like appearance.



The term tree duck, as applied to this species, is a misnomer, as this duck is neither a tree percher nor habitually a tree nester. It does occasionally build its nest in holes in hollow trees but usually the nests are placed in the tules or grasses on the edges of ponds or swamps. Nests have been found containing upwards of 100 eggs, and very frequently thirty or more eggs are found in one nest. Twelve to 17 eggs, however, constitute the usual number found; the larger sets are probably the product of more than one female, as it is well known that many of the slough-nesting ducks are careless about laying their eggs in the nests of other ducks. The colour of the eggs is white to buffy white, and they average in size 2.10 by 1.60 inches.

Of the food of this species, Grinnell, Bryant, and Storer (1918) say: "The Fulvous Tree-duck feeds largely on the seeds of grasses and weeds. In Mexico and Texas it is said to visit the cornfields at night where it finds palatable provender. When feeding in muddy or marshy situations the birds thrust their bills deep in the soft mud on both sides and in front of them as they walk along. The stomach of an individual . . . examined by us, contained finely cut up grass and other vegetable matter." Shields (1899) says that these ducks "are equally at home in an alfalfa patch (about dusk) or in a lake of water, and are entirely at home in an oak forest . . . where they are said to assemble for the purpose of feeding on acorns."

They are easily approached, but not easy to find, as they inhabit the dense tules and marshy ponds. If suddenly surprised they will often stand rigidly with their long necks up-stretched and in this pose may readily be mistaken for standing stalks of the surrounding vegetation. Col. Grayson is quoted by Lawrence (1874) as saying: "Their flesh is white, juicy, and, feeding upon grain and seed, is free from the strong or rank flavor of most other ducks; they are rather heavy or bulky and usually fat. . . . When only winged they are almost sure to make their escape, which their long and stout legs enable them to do, running and springing with extraordinary agility, and ultimately eluding pursuit by dodging into the grass or nearest thicket; if the water is deep they dive, and as they rise to breathe, having only the head above water, and that concealed among the water plants, they are soon abandoned by the hunter."



**WEIGHTS AND MEASUREMENTS
OF WILDFOWL****SWANS****MUTE SWAN**

MALE AND FEMALE: Length, 50" to 61". Weight, 25 to 30 lbs.

WHISTLING SWAN

MALE: Length, 48.0" to 57.4" av'ge (of 30) 52.1". Wing-spread, 74.25" to 97"; av'ge (of 27) 83.5". Weight, 12 lbs. to 18 lbs. 10 oz.; av'ge (of 26) 16 lbs. 4 oz.

FEMALE: Length, 47.0" to 58.2"; av'ge (of 39) 51.5". Wing-spread, 74.6" to 69.0"; av'ge (of 33) 81.7". Weight, 10 lbs. 8 oz. to 18 lbs.; av'ge (of 36) 13 lbs. 14 oz.

TRUMPETER SWAN

MALE: Length, 60.0" to 72.0"; av'ge (of 4) 66.5". Wing-spread, 92.0" to 98.0"; av'ge (of 3) 95.5". Weight, 21 lbs. to 38 lbs.; av'ge (of 6) 28 lbs.

FEMALE: Length, ----- Wing-spread, 83.0" to 91.6"; av'ge (of 2) 87.3". Weight, 20 lbs. to 24 lbs. 8 oz.; av'ge (of 4) 22 lbs. 9 oz.

Note: Audubon refers to one Trumpeter which had a wing-spread of nearly 12 ft., and which weighed over 38 lbs. Other authorities give the wing-spread as from 8 ft. to 10 ft., and the weight as from 20 lbs. to 36 lbs.

GEESE**COMMON CANADA GOOSE**

MALE: Length, 35.0" to 39.4"; av'ge (of 20) 37.2". Wing-spread, 63.0" to 76.0"; av'ge (of 17) 68.8". Weight, 8 lbs. 2 oz. to 13 lbs. 8 oz.; av'ge (of 83) 9 lbs. 3 oz.

FEMALE: Length, 31.9" to 39.2"; av'ge (of 21) 35.0". Wing-spread, 59.5" to 75.4"; av'ge (of 15) 64.4". Weight, 7 lbs. 6 oz. to 13 lbs.; av'ge (of 60) 7 lbs. 14 oz.

WESTERN CANADA GOOSE

MALE: Length, 33.0" to 35.3"; av'ge (of 4) 34.3". Wing-spread, 63.0" to 65.7"; av'ge (of 2) 64.3". Weight, 7 lbs. 5 oz. to 12 lbs. 8 oz.; av'ge (of 8) 10 lbs. 4 oz.

FEMALE: Length, 31.5" to 32.3"; av'ge (of 5) 31.9". Wing-spread, 61.4" to 63.2"; av'ge (of 4) 61.9". Weight, 6 lbs. 10 oz. to 9 lbs. 8 oz.; av'ge (of 5) 7 lbs. 13 oz.

LESSER CANADA GOOSE

MALE: Length, 26.5" to 30.0"; av'ge (of 23) 28.6". Wing-spread, 53.5" to 61.8"; av'ge (of 22) 57.9". Weight, 4 lbs. 3 oz. to 7 lbs. 2 oz.; av'ge (of 17) 5 lbs. 2 oz.

FEMALE: Length, 25.5" to 30.7"; av'ge (of 18) 27.0". Wing-spread, 52.0" to 61.0" av'ge (of 18) 55.2". Weight, 3 lbs. 10 oz. to 7 lbs. 3 oz.; av'ge (of 14) 4 lbs. 8 oz.

RICHARDSON'S GOOSE

MALE: Length, (1 only) 28.7". Weight, 3 lbs. 11 oz. to 6 lbs.; av'ge (of 15) 4 lbs. 14 oz.

FEMALE: Length, 22.5" to 27.0" av'ge (of 5) 24.5". Wing-spread, 44.5" to 55.0"; av'ge (of 3) 49.8". Weight, 3 lbs. to 5 lbs. 2 oz.; av'ge (of 12) 4 lbs.

CACKLING GOOSE

MALE: Length, 23.0" to 27.0"; av'ge (of 28) 24.4". Wing-spread, 48.0" to 57.0"; av'ge (of 27) 52.1". Weight, 3 lbs. to 4 lbs. 2 oz.; av'ge (of 28) 3 lbs. 6 oz.
FEMALE: Length, 22.0" to 26.0"; av'ge (of 27) 23.1". Wing-spread, 43.5" to 51.0"; av'ge (of 26) 48.4". Weight, 2 lbs. 8 oz. to 3 lbs. 2 oz.; av'ge (of 17) 2 lbs. 13 oz.

AMERICAN BRANT

MALE: Length, 22.5" to 26.3"; av'ge (of 5) 24.3". Wing-spread, 43.5" to 48.0"; av'ge (of 3) 45.7". Weight, (1 only) 3 lbs. 3 oz.
FEMALE: Length, 21.8" to 23.5"; av'ge (of 4) 22.8". Wing-spread, 43.5" to 44.5"; av'ge (of 3) 43.9". Weight, 2 lbs. 3 oz. to 2 lbs. 11 oz.; av'ge (of 3) 2 lbs. 6 oz.

BLACK BRANT

MALE: Length, 23.7" to 26.0"; av'ge (of 23) 25.2". Wing-spread, 45.4" to 50.4"; av'ge (of 19) 47.6". Weight, 2 lbs. 11 oz. to 3 lbs. 11 oz.; av'ge (of 21) 3 lbs. 5 oz.
FEMALE: Length, 22.5" to 24.0"; av'ge (of 12) 23.1". Wing-spread, 44.1" to 47.2"; av'ge (of 10) 45.6". Weight, 2 lbs. 10 oz. to 3 lbs. 10 oz.; av'ge (of 14) 3 lbs. 2 oz.

BARNACLE GOOSE

MALE: Length, 27.0" to 27.95"; av'ge (of 2) 27.5". Wing-spread, (1 only) 56.0". Weight, 4 lbs. 1 oz. to 4 lbs. 7 oz.; av'ge (of 2) 4 lbs. 4 oz.
FEMALE: Length, (1 only) 23.5". Wing-spread, (1 only) 52.0". Weight, 2 lbs. 8 oz. to 2 lbs. 9 oz.; av'ge (of 2) 2 lbs. 8.5 oz.

EMPEROR GOOSE

MALE: Length, 26.0" to 28.0"; av'ge (of 7) 27.3". Wing-spread, 49.0" to 56.5"; av'ge (of 7) 52.6". Weight, 5 lbs. 8 oz. to 6 lbs. 12 oz.; av'ge (of 5) 6 lbs. 2 oz.
FEMALE: Length, 26.0" to 27.5"; av'ge (of 8) 26.6". Wing-spread, 48.0" to 53.5"; av'ge (of 8) 50.8". Weight, 5 lbs. 2 oz. to 6 lbs. 14 oz.; av'ge (of 4) 6 lbs. 4 oz.

WHITE-FRONTED GOOSE

MALE: Length, 27.2" to 30.0"; av'ge (of 11), 29.1". Wing-spread, 56.9" to 62.4"; av'ge (of 9), 58.8". Weight 4 lbs. 7 oz. to 7 lbs. 5 oz.; av'ge (of 21), 5 lbs. 5 oz.
FEMALE: Length, 25.6" to 28.5"; av'ge (of 5), 26.8". Wing-spread, 53.2" to 56.7"; av'ge (of 5), 55.6". Weight, 3 lbs. 14 oz. to 6 lbs. 4 oz.; av'ge (of 17), 4 lbs. 13 oz.

TULE GOOSE

MALE: Length, 30.0" to 34.0"; av'ge (of 15), 31.9". Wing-spread 57.0" to 65.4"; av'ge (of 15), 63.0". Weight, 5 lbs. 9 oz. to 7 lbs. 8 oz.; av'ge (of 16) 6 lbs. 11 oz.
FEMALE: Length, 28.5" to 31.9"; av'ge (of 13), 29.7". Wing-spread, 56.0" to 64.2"; av'ge (of 13), 57.9". Weight, 5 lbs. 4 oz. to 6 lbs. 8 oz.; av'ge (of 12), 5 lbs. 10 oz.

LESSER SNOW GOOSE

MALE: Length, 27.0" to 31.1"; av'ge (of 26), 29.1". Wing-spread, 54.5" to 60.5"; av'ge (of 21), 58.1". Weight, 4 lbs. 3 oz. to 6 lbs. 12 oz.; av'ge (of 19), 5 lbs. 5 oz.
FEMALE: Length, 26.2" to 29.4"; av'ge (of 19), 27.6". Wing-spread, 53.3" to 59.5"; av'ge (of 15), 56.5". Weight, 4 lbs. 6 oz. to 5 lbs. 8 oz.; av'ge (of 18), 4 lbs. 11 oz.

GREATER SNOW GOOSE

MALE: Length, 30.0" to 33.0"; av'ge (of 19), 31.5". Wing-spread, 58.0" to 62.5"; av'ge (of 14), 60.1". Weight, 5 lbs. 4 oz. to 10 lbs. 7 oz.; av'ge (of 19), 7 lbs. 7 oz.
FEMALE: Length, 28.7" to 31.0"; av'ge (of 17), 30.1". Wing-spread, 56.5" to 60.0"; av'ge (of 13), 58.4". Weight, 4 lbs. 8 oz. to 6 lbs. 8 oz.; av'ge (of 12), 6 lbs. 2 oz.

BLUE GOOSE

MALE: Length, 27.1" to 29.0"; av'ge (of 15), 28.4". Wing-spread (1 only), 54.3". Weight, 4 lbs. 7 oz. to 6 lbs. 4 oz.; av'ge (of 18), 5 lbs. 5 oz.

FEMALE: Length, 25.5" to 28.5"; av'ge (of 18), 27.0". Wing-spread, 55.1" to 59.2"; av'ge (of 4), 57.6". Weight, 4 lbs. 4 oz. to 6 lbs. 4 oz.; av'ge (of 17), 4 lbs. 14 oz.

ROSS'S GOOSE

MALE: Length, 23.0" to 25.6"; av'ge (of 27), 24.6". Wing-spread, 48.0" to 53.1"; av'ge (of 27), 51.3". Weight, 2 lbs. 6 oz. to 3 lbs. 10 oz.; av'ge (of 18), 2 lbs. 14 oz.

FEMALE: Length, 21.0" to 24.8"; av'ge (of 30), 23.1". Wing-spread, 47.0" to 54.1"; av'ge (of 29), 49.5". Weight, 2 lbs. 5 oz. to 3 lbs. 7 oz.; av'ge (of 19), 2 lbs. 11 oz.

RIVER AND POND DUCKS

COMMON MALLARD

MALE: Length, 21.8" to 26.7"; av'ge (of 53), 23.35". Wing-spread, 33.5" to 40.2"; av'ge (of 35), 36.4". Weight, 2 lbs. 4 oz. to 3 lbs. 9 oz.; av'ge (of 1,577), 2 lbs. 11 oz.

FEMALE: Length, 20.5" to 22.75"; av'ge (of 36), 21.5". Wing-spread, 30.3" to 38.0"; av'ge (of 26), 34.9". Weight, 2 lbs. to 3 lbs. 1 oz.; av'ge (of 1,177), 2 lbs. 6 oz.

BLACK DUCK

MALE: Length, 21.65" to 25.6"; av'ge (of 39), 23.5". Wing-spread, 34.6" to 40.2"; av'ge (of 21), 36.6". Weight, 2 lbs. to 3 lbs. 13 oz.; av'ge (of 35), 2 lbs. 12 oz.

FEMALE: Length, 21.2" to 24.5"; av'ge (of 23), 22.4". Wing-spread, 31.0" to 38.0"; av'ge (of 17), 34.3". Weight, 1 lb. 14 oz. to 2 lbs. 15 oz.; av'ge (of 33), 2 lbs. 8 oz.

GADWALL

MALE: Length, 19.1" to 23.0"; av'ge (of 25), 20.9". Wing-spread, 32.2" to 36.0"; av'ge (of 24), 35.1". Weight, 1 lb. 9 oz. to 2 lbs. 8 oz.; av'ge (of 122), 2 lbs.

FEMALE: Length, 18.7" to 21.0"; av'ge (of 14), 19.4". Wing-spread, 30.7" to 34.5"; av'ge (of 9), 32.7". Weight, 1 lb. 5 oz. to 2 lbs. 4 oz.; av'ge (of 101), 1 lb. 13 oz.

EUROPEAN WIDGEON

MALE: Length, 18.2" to 20.5"; av'ge (of 15), 19.3". Wing-spread, 29.7" to 33.0"; av'ge (of 3), 31.6". Weight, 1 lb. 3 oz. to 2 lbs. 1 oz.; av'ge (of 12), 1 lb. 9 oz.

FEMALE: Length, 16.5" to 19.5"; av'ge (of 7), 17.9". Wing-spread, 31.1" to 35.5"; av'ge (of 2), 31.3". Weight, 1 lb. 1 oz. to 1 lb. 12 oz.; av'ge (of 5), 1 lb. 6 oz.

BALDPATE

MALE: Length, 18.9" to 23.0"; av'ge (of 23), 20.45". Wing-spread, 30.0" to 35.7"; av'ge (of 18), 33.7". Weight, 1 lb. 7 oz. to 2 lbs. 8 oz.; av'ge (of 112), 1 lb. 11 oz.

FEMALE: Length, 17.9" to 19.3"; av'ge (of 12), 18.5". Wing-spread, 30.0" to 33.0"; av'ge (of 9), 31.3". Weight, 1 lb. 2 oz. to 1 lb. 13 oz.; av'ge (of 73), 1 lb. 9 oz.

AMERICAN PINTAIL

MALE: Length, 24.8" to 29.0"; av'ge (of 16), 26.8". Wing-spread, 32.0" to 37.0"; av'ge (of 10), 35.2". Weight, 1 lb. 10 oz. to 2 lbs. 5 oz.; av'ge (of 352), 2 lbs. 2½ oz.

FEMALE: Length, 20.5" to 22.6"; av'ge (of 23), 21.6". Wing-spread, 29.3" to 35.2"; av'ge (of 16), 33.1". Weight, 1 lb. 6 oz. to 2 lbs. 6 oz.; av'ge (of 271), 1 lb. 13 oz.

EUROPEAN TEAL

MALE: Length, 14.2" to 15.6"; av'ge (of 8), 15.0". Wing-spread, about 24.0". Weight, 9 to 14 oz.; av'ge (of 9), 11.3 oz.

FEMALE: Length, 12.7" to 13.7"; av'ge (of 3), 13.2". Wing-spread, about 22.0".

GREEN-WINGED TEAL

MALE: Length, 12.7" to 15.7"; av'ge (of 27), 14.65". Wing-spread, 22.4" to 25.0"; av'ge (of 15), 23.7". Weight, 10 to 14 oz.; av'ge (of 130), 12.8 oz.

FEMALE: Length, 12.5" to 15.2"; av'ge (of 26), 14.0". Wing-spread, 20.0" to 24.0"; av'ge (of 14), 22.2". Weight, 9 to 12 oz.; av'ge (of 68), 12 oz.

BLUE-WINGED TEAL

MALE: Length, 15.1" to 16.4"; av'ge (of 21), 15.8". Wing-spread, 23.5" to 25.7"; av'ge (of 10), 24.6". Weight, 11 oz. to 1 lb. 4 oz.; av'ge (of 73), 14.6 oz.

FEMALE: Length, 14.4" to 16.0"; av'ge (of 16), 15.2". Wing-spread, 22.5" to 24.6"; av'ge (of 9), 23.6". Weight, 11 oz. to 1 lb. 3 oz.; av'ge (of 82), 13.6 oz.

CINNAMON TEAL

MALE: Length, 15.3" to 17.0"; av'ge (of 18), 16.0". Wing-spread, 23.5" to 26.0"; av'ge (of 10), 25.2". Weight, 10 oz. to 1 lb. 2 oz.; av'ge (of 13), 12.0 oz.

FEMALE: Length, 14.5" to 16.3"; av'ge (of 10), 15.5". Wing-spread, 22.7" to 25.0"; av'ge (of 5), 23.9". Weight, 10 oz. to 1 lb. 2 oz.; av'ge (of 11), 12.5 oz.

SHOVELLER

MALE: Length, 18.0" to 21.5"; av'ge (of 42), 19.7". Wing-spread, 29.0" to 33.2"; av'ge (of 24), 31.4". Weight, 1 lb. 3 oz. to 1 lb. 13 oz.; av'ge (of 86), 1 lb. 7 oz.

FEMALE: Length, 17.0" to 20.2"; av'ge (of 18), 18.6". Wing-spread, 27.3" to 31.7"; av'ge (of 11), 29.8". Weight, 15 oz. to 1 lb. 10 oz.; av'ge (of 68), 1 lb. 4 oz.

WOOD DUCK

MALE: Length, 17.0" to 20.5"; av'ge (of 33), 18.6". Wing-spread, 27.2" to 29.4"; av'ge (of 14), 28.3". Weight, 12 oz. to 1 lb. 13 oz.; av'ge (of 30), 1 lb. 8 oz.

FEMALE: Length, 17.0" to 19.5"; av'ge (of 15), 17.7". Wing-spread, 27.5" to 29.5"; av'ge (of 6), 28.3". Weight, 12 oz. to 1 lb. 9 oz.; av'ge (of 13), 1 lb. 2½ oz.

BAY, SEA, or DIVING DUCKS

REDHEAD

MALE: Length, 18.1" to 21.7"; av'ge (of 42), 20.0". Wing-spread, 30.7" to 35.0"; av'ge (of 16), 33.1". Weight, 1 lb. 14 oz. to 3 lbs.; av'ge (of 70), 2 lbs. 8 oz.

FEMALE: Length, 18.0" to 20.5"; av'ge (of 29), 19.0". Wing-spread, 29.0" to 31.9"; av'ge (of 10), 30.9". Weight, 1 lb. 6 oz. to 2 lbs. 11 oz.; av'ge (of 26), 2 lbs. 4 oz.

RING-NECKED DUCK

MALE: Length, 16.1" to 18.2"; av'ge (of 30), 17.0". Wing-spread, 26.3" to 29.5"; av'ge (of 14), 27.7". Weight, 1 lb. 5 oz. to 1 lb. 15 oz.; av'ge (of 23), 1 lb. 11½ oz.

FEMALE: Length, 14.2" to 18.0"; av'ge (of 33), 16.3". Wing-spread, 24.0" to 28.0"; av'ge (of 18), 26.8". Weight, 1 lb. 3 oz. to 1 lb. 13 oz.; av'ge (of 23), 1 lb. 8½ oz.

CANVAS-BACK

MALE: Length, 19.2" to 23.2"; av'ge (of 30), 21.6". Wing-spread, 31.5" to 35.5"; av'ge (of 19), 33.7". Weight, 2 lbs. 4 oz. to 3 lbs. 9 oz.; av'ge (of 102), 3 lbs.

FEMALE: Length, 19.7" to 24.3"; av'ge (of 13), 20.8". Wing-spread, 28.8" to 33.5"; av'ge (of 5), 31". Weight, 1 lb. 14 oz. to 3 lbs. 6 oz.; av'ge (of 102), 2 lbs. 13 oz.

GREATER SCAUP DUCK

MALE: Length, 16.5" to 20.2"; av'ge (of 35), 18.6". Wing-spread, 29.0" to 34.5"; av'ge (of 19), 31.1". Weight, 1 lb. 5 oz. to 2 lbs. 10 oz.; av'ge (of 24), 2 lbs. 1 oz.

FEMALE: Length, 15.5" to 18.7"; av'ge (of 18), 17.0". Wing-spread, 28.0" to 31.5"; av'ge (of 8), 30.1". Weight, 1 lb. 5 oz. to 2 lbs. 15 oz.; av'ge (of 18), 2 lbs.

LESSER SCAUP DUCK

MALE: Length, 15.7" to 18.7"; av'ge (of 37), 17.0". Wing-spread, 26.5" to 33.0"; av'gs (of 18), 28.7". Weight, 1 lb. 6 oz. to 2 lbs. 5 oz.; av'ge (of 112), 1 lb. 14 oz.

FEMALE: Length, 14.8" to 18.7"; av'ge (of 34), 16.25". Wing-spread, 23.3" to 28.7"; av'ge (of 22), 26.6". Weight, 1 lb. 3 oz. to 2 lbs. 2 oz.; av'ge (of 118), 1 lb. 12 oz.

AMERICAN GOLDEN-EYE

MALE: Length, 17.9" to 20.2"; av'ge (of 43), 19.2". Wing-spread, 28.0" to 32.2"; av'ge (of 23), 30.7". Weight, 1 lb. 9 oz. to 2 lbs. 14 oz.; av'ge (of 36), 2 lbs. 2½ oz.

FEMALE: Length, 15.7" to 19.7"; av'ge (of 40), 17.0". Wing-spread, 24.9" to 30.2"; av'ge (of 14), 27.8". Weight, 1 lb. 6 oz. to 2 lbs. 4 oz.; av'ge (of 33), 1 lb. 11½ oz.

BARROW'S GOLDEN-EYE

MALE: Length, 18.6" to 19.9"; av'ge (of 2), 19.2". Weight (1 only), 2 lbs. 14 oz.

FEMALE: Length, 16.2" to 17.7"; av'ge (of 2), 17.0". Weight (1 only), 1 lb. 10 oz.

BUFFLE-HEAD

MALE: Length, 14.2" to 15.7"; av'ge (of 34), 14.8". Wing-spread, 23.0" to 24.2"; av'ge (of 16), 23.6". Weight, 13 oz. to 1 lb. 4 oz.; av'ge (of 17), 1 lb.

FEMALE: Length, 12.8" to 14.6"; av'ge (of 16), 13.5". Wing-spread, 21.2" to 22.2"; av'ge (of 9), 21.8". Weight, 8 oz. to 1 lb. 5 oz.; av'ge (of 14), 12 oz.

OLD-SQUAW

MALE: Length, 19.0" to 22.6"; av'ge (of 35), 20.8". Wing-spread, 27.2" to 31.0"; av'ge (of 24), 29.6". Weight, 1 lb. 9 oz. to 2 lbs. 5 oz.; av'ge (of 21), 1 lb. 13 oz.

FEMALE: Length, 14.8" to 17.0"; av'ge (of 29), 15.6". Wing-spread, 25.8" to 29.0"; av'ge (of 21), 27.6". Weight, 1 lb. 2 oz. to 1 lb. 12 oz.; av'ge (of 10), 1 lb. 7 oz.

HARLEQUIN DUCK (BOTH SUBSPECIES)

MALE: Length, 16.0" to 21.2"; av'ge (of 16), 17.3". Wing-spread, 24.5" to 27.75"; av'ge (of 8), 26.25". Weight, 1 lb. 4 oz. to 1 lb. 9 oz.; av'ge (of 3), 1 lb. 7 oz.

FEMALE: Length, 14.6" to 17.2"; av'ge (of 11), 15.8". Wing-spread, 23.0" to 24.2"; av'ge (of 3), 23.8". Weight, 1 lb. 1 oz. to 1 lb. 5 oz.; av'ge (of 3), 1 lb. 3½ oz.

STELLER'S EIDER

MALE: Length, 17.5" to 18.5"; av'ge (of 8), 18.1". Wing-spread, 29.0" to 29.2"; av'ge (of 7), 29.0". Weight, 1 lb. 14 oz. to 2 lbs. 2 oz.; av'ge (of 5), 1 lb. 15 oz.

FEMALE: Length, 17.1" to 18.1" av'ge (of 9), 17.5". Wing-spread, 28.0" to 29.6"; av'ge (of 8), 28.7". Weight, 1 lb. 14 oz. to 2 lbs.; av'ge (of 5), 1 lb. 15 oz.

AMERICAN EIDER

MALE: Length, 22.5" to 26.8"; av'ge (of 19), 24.0". Wing-spread, 39.0" to 42.0"; av'ge (of 3), 40.2". Weight, 3 lbs. 15 oz. to 4 lbs. 10 oz.; av'ge (of 3), 4 lbs. 6 oz.

FEMALE: Length, 21.0" to 24.4" av'ge (of 23), 22.8". Wing-spread, 35.2" to 42.0"; av'ge (of 7), 38.8". Weight, 2 lbs. 10 oz. to 3 lbs. 12 oz.; av'ge (of 8), 3 lbs. 6 oz.

PACIFIC EIDER

MALE: Length, 24.4" to 27.4"; av'ge (of 6), 25.7". Wing-spread, 42.2" to 43.5"; av'ge (of 6), 42.9". Weight, 5 lbs. 1 oz. to 6 lbs. 3 oz.; av'ge (of 7), 5 lbs. 12 oz.

FEMALE: Length, 23.0" to 24.7"; av'ge (of 5), 23.7". Wing-spread, 39.0" to 41.7"; av'ge (of 5), 40.4". Weight, 4 lbs. 11 oz. to 6 lbs. 6 oz.; av'ge (of 4), 5 lbs. 7 oz.

KING EIDER

MALE: Length, 21.7" to 25.0"; av'ge (of 32), 22.7". Wing-spread, 34.0" to 40.0"; av'ge (of 8), 36.5". Weight, 3 lbs. 11 oz. to 4 lbs. 7 oz.; av'ge (of 13), 4 lbs.

FEMALE: Length, 18.5" to 22.5"; av'ge (of 27), 21.1". Wing-spread, 35.0" to 37.5"; av'ge (of 16), 36.4". Weight, 2 lbs. 12 oz. to 4 lbs. 2 oz.; av'ge (of 8), 3 lbs. 10 oz.

SPECTACLED EIDER

Male: Length, 21.0" to 22.5"; av'ge (of 3), 21.7". Wing-spread, 36.0" to 36.5"; av'ge (of 3), 36.2". Weight, 3 lbs. 3 oz. to 3 lbs. 12 oz.; av'ge (of 8), 3 lbs. 10 oz.

FEMALE: Length, 20.7" to 21.0"; av'ge (of 2), 20.9". Wing-spread (1 only), 34.7". Weight, 3 lbs. 6 oz. to 3 lbs. 14 oz.; av'ge (of 4), 3 lbs. 10 oz.

WHITE-WINGED SCOTER

MALE: Length, 20.75" to 23.0"; av'ge (of 20), 21.6". Wing-spread, 36.0" to 39.5"; av'ge (of 13), 37.9". Weight, 3 lbs. to 3 lbs. 15 oz.; av'ge (of 7), 3 lbs. 8 oz.

FEMALE: Length, 19.0" to 23.6"; av'ge (of 28), 20.6". Wing-spread, 34.4" to 39.7"; av'ge (of 17), 37.1". Weight, 2 lbs. 2 oz. to 3 lbs. 1 oz.; av'ge (of 15), 2 lbs. 10 oz.

SURF SCOTER

MALE: Length, 18.0" to 20.9"; av'ge (of 17), 19.6". Wing-spread, 31.2" to 34.0"; av'ge (of 8), 32.9". Weight, 1 lb. 7 oz. to 2 lbs. 8 oz.; av'ge (of 10), 2 lbs. 3 oz.

FEMALE: Length, 17.0" to 19.0"; av'ge (of 13), 18.0". Wing-spread, 30.0" to 32.5"; av'ge (of 6), 31.3". Weight, 1 lb. 8 oz. to 2 lbs. 3 oz.; av'ge (of 7), 2 lbs.

AMERICAN SCOTER

MALE: Length, 18.0" to 20.9"; av'ge (of 5), 19.7". Wing-spread, 33.0" to 33.5"; av'ge (of 2), 33.2". Weight, 2 lbs. 3 oz. to 2 lbs. 13 oz.; av'ge (of 7), 2 lbs. 8 oz.

FEMALE: Length, 17.0" to 19.0"; av'ge (of 6), 18.5". Wing-spread, 29.7" to 33.0"; av'ge (of 3), 31.9". Weight, 1 lb. 15 oz. to 2 lbs. 7 oz.; av'ge (of 2), 2 lbs. 3 oz.

MERGANSERS

HOODED MERGANSER

MALE: Length, 17.0" to 19.2"; av'ge (of 31), 18.1". Wing-spread, 25.0" to 27.5"; av'ge (of 17), 26.0". Weight, 1 lb. 5 oz. to 1 lb. 15 oz.; av'ge (of 19), 1 lb. 8 oz.

FEMALE: Length, 16.0" to 18.0"; av'ge (of 23), 17.1". Wing-spread, 22.0" to 26.5"; av'ge (of 13), 24.6". Weight, 1 lb. to 1 lb. 7 oz.; av'ge (of 12), 1 lb. 3½ oz.

AMERICAN MERGANSER

MALE: Length, 23.5" to 27.1"; av'ge (of 42), 25.5". Wing-spread, 35.0" to 38.2"; av'ge (of 16), 36.7". Weight, 2 lbs. 9 oz. to 4 lbs. 2 oz.; av'ge (of 35), 3 lbs. 7 oz.

FEMALE: Length, 21.3" to 26.6"; av'ge (of 39), 22.9". Wing-spread, 32.8" to 37.7" av'ge (of 14), 34.3". Weight, 1 lb. 12 oz. to 2 lbs. 14 oz.; av'ge (of 20), 2 lbs. 6 oz.

RED-BREASTED MERGANSER

MALE: Length, 21.8" to 26.0"; av'ge (of 27), 23.3". Wing-spread, 31.5" to 34.0"; av'ge (of 15), 33.1". Weight, 2 lbs. 7 oz. to 2 lbs. 14 oz.; av'ge (of 15), 2 lbs. 10 oz.

FEMALE: Length, 19.2" to 22.9"; av'ge (of 21), 20.9". Wing-spread, 27.8" to 33.0"; av'ge (of 16), 30.7". Weight, 1 lb. 7 oz. to 1 lb. 15 oz.; av'ge (of 11), 1 lb. 13 oz.

RUDDY DUCKS, AND TREE DUCKS

RUDDY DUCK

MALE: Length, 14.7" to 16.0"; av'ge (of 23), 15.4". Wing-spread, 21.5" to 24.2"; av'ge (of 11), 22.6". Weight, 1 lb. 3 oz. to 1 lb. 12 oz.; av'ge (of 8), 1 lb. 5½ oz.

FEMALE: Length, 14.5" to 16.2"; av'ge (of 15), 15.1". Wing-spread, 21.0" to 23.7"; av'ge (of 8), 22.4". Weight, 11 oz. to 1 lb. 7 oz.; av'ge (of 13), 1 lb. 2 oz.

MASKED DUCK

MALE: Length, av'ge (of 2), 14.0". Wing-spread (1 only), 20.5".

FEMALE: Length (1 only), 13.0". Wing-spread (1 only), 20.0".

FULVOUS TREE DUCK

MALE: Length, 18.7" to 20.0"; av'ge (of 4), 19.2". Wing-spread (1 only), 36.5". Weight (1 only), 1 lb. 11 oz.

FEMALE: Length, 17.0" to 28.7"; av'ge (of 4), 18.4".

COLOUR PLATES
OF THE
DUCKS, GEESE AND SWANS
SHOWING
WINTER AND AUTUMN PLUMAGES

*Key to Plate No. 1**Plate No. 1* ➡

- (A) MUTE SWAN, adult. Sexes alike.
- (B) MUTE SWAN, juvenile head.
- (C) TRUMPETER SWAN, adult. Sexes alike.
- (D) TRUMPETER SWAN, juvenile head and foot.
- (E) WHISTLING SWAN, adult (showing yellow spot on lores). Sexes alike.
- (F) WHISTLING SWAN, adult head (showing lack of yellow spot on lores).
- (G) WHISTLING SWAN, juvenile.
- (H) Typical adult Swan wing.

Text. Mute Swan, page 66; Trumpeter Swan, page 77; Whistling Swan, page 69.



A

B

MUTE SWAN



C

D

TRUMPETER SWAN



G

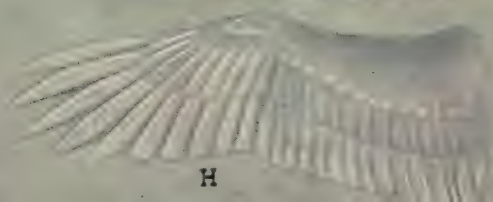
WHISTLING SWAN
(juvenile)



E

F

WHISTLING SWAN



H

Key to Plate No. 2

Plate No. 2 →

- (A) COMMON CANADA GOOSE, adult. Sexes alike.
- (B) LESSER CANADA GOOSE, adult. Sexes alike.
- (C) RICHARDSON'S GOOSE, adult. Sexes alike.
- (D) WESTERN CANADA GOOSE, adult. Sexes alike.
- (E) CACKLING GOOSE, adult. Sexes alike.
- (F) Head, showing divided cheek patches.
- (G) Head and neck, showing white collar at base of "stocking."
- (H) Wing, typical of the five subspecies.

Chief distinguishing features of the CANADA GOOSE species: (a) Head and full length of neck, black, except for white cheek patches.

Note: Juveniles closely resemble adults.

Downy Young, Plate No. 32.

Text: page 81.



RICHARDSON'S GOOSE



COMMON CANADA GOOSE



LESSER CANADA GOOSE



H



F



G



E

CACKLING GOOSE



D

WESTERN CANADA GOOSE

T.M. Shortt

(A) AMERICAN BRANT, adult. Sexes alike.

(B) AMERICAN BRANT, adult wing.

(C) AMERICAN BRANT, juvenile wing.

Note: The juvenile closely resembles the adult except for the wing-coverts as shown.

Chief distinguishing features of AMERICAN BRANT: (a) White collar incomplete before and behind, (b) black of chest sharply defined against lighter colour of breast and sides, (c) greyish-white breast.

(D) BLACK BRANT, adult. Sexes alike.

(E) BLACK BRANT, adult wing.

(C) BLACK BRANT, juvenile wing.

Note: The juvenile closely resembles the adult except for the wing-coverts as shown.

Chief distinguishing features of BLACK BRANT: (a) White collar incomplete behind, complete in front, (b) black of chest merges into dark breast, (c) breast, slaty brown.

(F) EMPEROR GOOSE, adult. Sexes alike.

(G) EMPEROR GOOSE, adult wing.

Note: The juvenile closely resembles the adult.

Chief distinguishing features of EMPEROR GOOSE: (a) Head and hind-neck, white (often suffused with rusty), definitely outlined against black foreneck, (b) feet, orange yellow.

(H) BARNACLE GOOSE, adult. Sexes alike.

(J) BARNACLE GOOSE, adult wing.

Note: The juvenile closely resembles the adult.

Chief distinguishing features of BARNACLE GOOSE: (a) White head, with black crown and hind head, and small black patch between eye and bill, (b) solidly black chest and neck.

Downy Young, Plate. No. 32.

Text: American Brant, page 102; Black Brant, page 106; Emperor Goose, page 113; Barnacle Goose, page 110.



B



C



D

BLACK BRANT



A

AMERICAN BRANT



H

BARNACLE GOOSE



F

EMPEROR GOOSE



J



G

T.M. Short

*Key to Plate No. 4**Plate No. 4 →*

- (A) WHITE-FRONTED GOOSE, adult. Sexes alike.
- (B) WHITE-FRONTED GOOSE, adult wing.
- (C) WHITE-FRONTED GOOSE, juvenile. Sexes alike.
- (D) WHITE-FRONTED GOOSE, juvenile wing.
- (E) TULE GOOSE, adult head.

Chief distinguishing features of WHITE-FRONTED GOOSE: (a) White band around face at base of bill (the "white-front"), (b) breast, whitish, irregularly splashed with black or dusky brown, (c) feet, yellowish.

Chief distinguishing features of TULE GOOSE: Similar to White-fronted Goose. For distinctions see "Specimen Identification" of Tule Goose in text.

- (F) BLUE GOOSE, adult. Sexes alike.
- (G) BLUE GOOSE, adult wing.
- (H) BLUE GOOSE, juvenile. Sexes alike
- (J) BLUE GOOSE, juvenile wing.

Chief distinguishing features of BLUE GOOSE: (a) White head and neck, (b) pinkish bill, with broad black "grinning" patch, (c) greyish-blue wing-coverts.

Downy Young, Plate No. 32.

Text: White-fronted Goose, page 117; Tule Goose, page 123; Blue Goose, page 136.



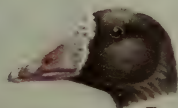
B



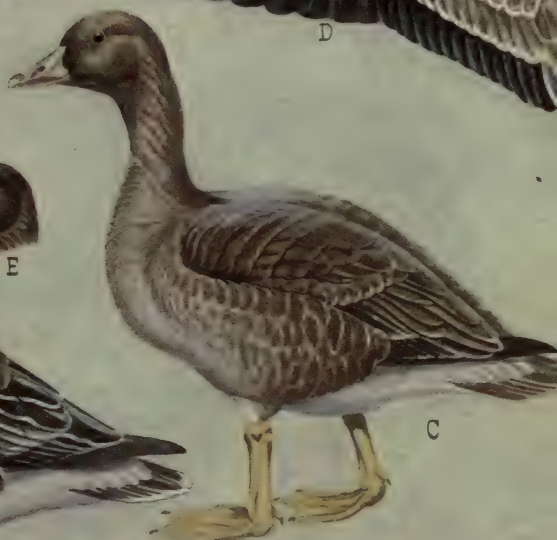
D



A



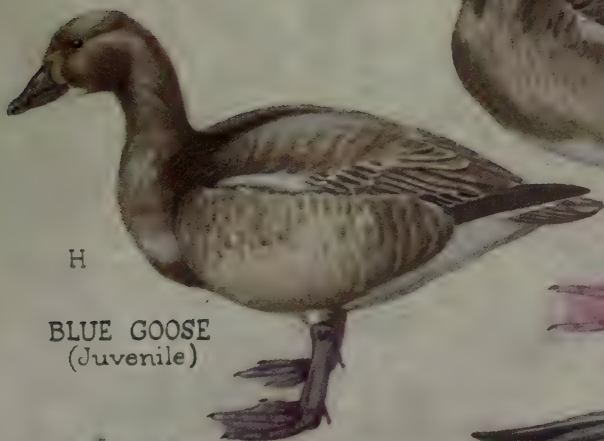
E



C

WHITE-FRONTED GOOSE
(Juvenile)

WHITE-FRONTED GOOSE



H

BLUE GOOSE
(Juvenile)



F

BLUE GOOSE



J



G

*Key to Plate No. 5**Plate No. 5 →*

- (A) ROSS'S GOOSE, adult. Sexes alike.
- (B) ROSS'S GOOSE, adult wing.
- (C) ROSS'S GOOSE, juvenile. Sexes alike.
- (D) ROSS'S GOOSE, juvenile wing.

Chief distinguishing features of ROSS'S GOOSE: (a) White plumage, with black primaries and grey primary-coverts, (b) reddish bill, with warty protuberances on base of upper mandible, (c) very small size.

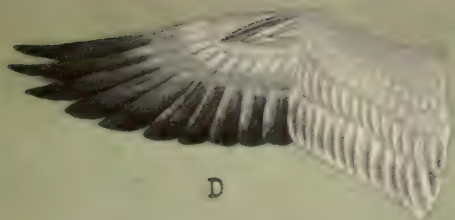
- (E) LESSER SNOW GOOSE, adult. Sexes alike.
- (F) LESSER SNOW GOOSE, adult wing.
- (G) LESSER SNOW GOOSE, juvenile. Sexes alike.
- (H) LESSER SNOW GOOSE, juvenile wing.

Chief distinguishing features of LESSER SNOW GOOSE: (a) White plumage, with black primaries and grey primary-coverts, (b) red bill, with broad black "grinning" patch.

(Note: The Greater Snow Goose is identical with the Lesser Snow Goose, except that it is a larger, heavier, chunkier bird with a thicker neck and larger head and bill.)

Downy Young, Plate No. 32.

Text: ROSS'S GOOSE, page 144; LESSER SNOW GOOSE, page 127; GREATER SNOW GOOSE, page 132.



D



B



C

ROSS'S GOOSE
(juvenile)



A

ROSS'S GOOSE



G

SNOW GOOSE
(juvenile)



E

SNOW GOOSE



H



F

WINTER AND AUTUMN PLUMAGES

- (A) COMMON MALLARD, adult female.
- (B) COMMON MALLARD, adult male in early stage of autumn plumage.
- (C) COMMON MALLARD, adult male in later stage of autumn plumage.
- (D) COMMON MALLARD, adult male in advanced stage of autumn plumage.
- (E) COMMON MALLARD, adult male in full winter plumage.
- (F) COMMON MALLARD, adult wing, both sexes.

Chief distinguishing features of COMMON MALLARD: MALE. (a) Hind toe without lobe, (b) green head and neck, with white collar, (c) speculum, bordered in front and behind with white bars, (d) middle upper tail-coverts curled upwards. FEMALE. (a) Hind toe without lobe, (b) speculum, bordered in front and behind with white bars, (c) bill, orange and dusky, (d) tail, very pale or whitish.

Downy Young, Plate No. 33.
Hybrids, Plate No. 36.

Text: page 149.

“ECLIPSE” PLUMAGE

This plate illustrates the phenomenon of the “eclipse” moult which takes place in the males of most of the ducks during the summer.

EXPLANATION. Fig. (E) shows the Mallard drake in full winter plumage. Fig. (A) shows the female Mallard.

As soon as incubation is well started in the early summer, the males of most of the ducks desert the females, gather in flocks by themselves and proceed to moult their striking winter plumage shown in Fig. (E).

The males then take on a plumage which in most cases is similar to that of the female, Fig. (A). While in this dress the flight-feathers are shed simultaneously, possibly on the same day, and the birds lose the power of flight until the flight-feathers are renewed.

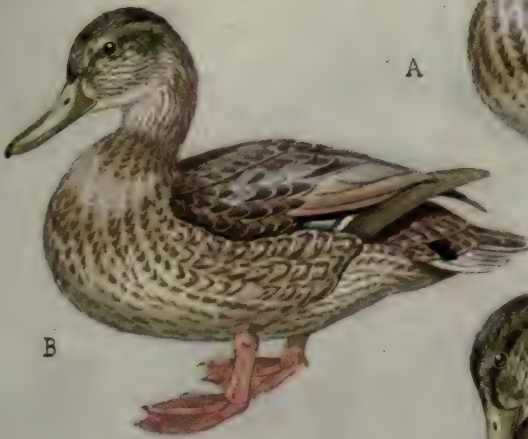
As soon as the flight-feathers are grown in again (usually in August) the birds commence a second moult out of the female-like eclipse plumage, Fig. (A), back into the full winter dress, Fig. (E), and during the autumn are found in various stages of this moult as shown by Figs (B), (C) and (D).

For details of moults and plumages see page 22.



A

MALLARD FEMALE



B

MALLARD DRAKE
(Autumn)



C



D



E

MALLARD DRAKE
(Winter)



F

ImShortt

Key to Plate No. 7

Plate No. 7 →

(A) BLACK DUCK, adult male.

Feather from side of chest shows distinctive U-shaped marking of chest-feathers of full-plumaged adult male.

(B) BLACK DUCK, head of adult female.

Feather from side of chest shows distinctive V-shaped marking of chest-feathers of full-plumaged adult female.

(C) BLACK DUCK, wing of adult, both sexes.

(D) BLACK DUCK, juvenile.

Feather from side of chest shows lack of central marking as in adult. Feather is narrower than that of adult.

(E) BLACK DUCK, adult male in eclipse plumage.

Feather from side of chest shows lack of central marking as in full plumage. Bill and feet, duller than when in full plumage.

(Note: Wings not fully grown. The bird here shown was painted from a specimen shot on July 11, 1940, at Fort Severn, Ontario, on Hudson's Bay.)

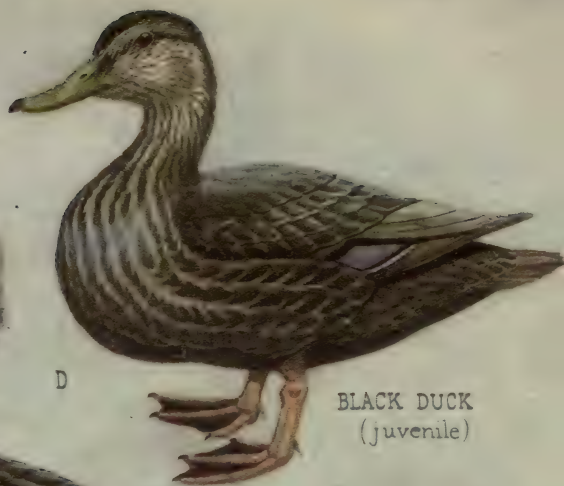
(F) BLACK DUCK, showing variation in colour of feet.

Downy Young, Plate No. 33.
Hybrids, Plate No. 36.

Text: page 160.



BLACK DUCK
(adult male)



BLACK DUCK
(juvenile)



BLACK DUCK
(eclipse male)

T.M. Shortt



C



F

- (A) COMMON MALLARD, adult female. (Repeated for comparison.)
- (B) COMMON MALLARD, adult wing. (Repeated for comparison.)
- (C) NEW MEXICAN DUCK, adult male. Sexes similar.
- (D) NEW MEXICAN DUCK, adult male wing (that of female similar).
- (E) NEW MEXICAN DUCK, adult female bill.

Chief distinguishing features of NEW MEXICAN DUCK: MALE. (a) Hind toe without lobe, (b) speculum, bordered in front and behind with black and white bars; white bar in front may be mixed with dusky or buff, (c) bill and nail, greenish yellow, (d) darker in coloration than female Mallard, and more heavily marked below, (e) breast-feathers, see text. FEMALE. As above except (c) bill, dusky on ridge, brilliant yellow on sides, with black nail, (e) breast-feathers, see text.

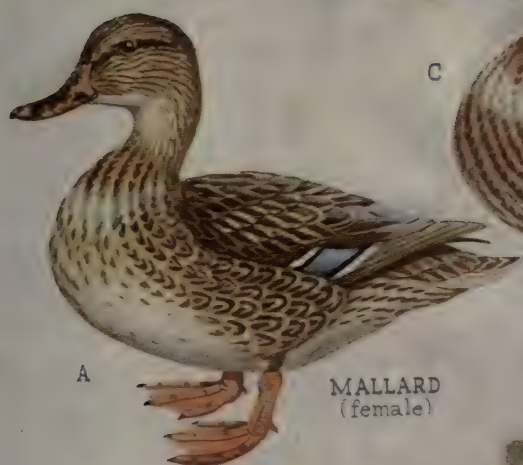
- (F) FLORIDA DUCK, adult. Sexes alike.
- (G) FLORIDA DUCK, adult female bill.
- (H) MOTTLED DUCK, adult. Sexes alike.
- (J) Wing of FLORIDA and MOTTLED DUCKS.

Chief distinguishing features of FLORIDA DUCK: BOTH SEXES. (a) Hind toe without lobe, (b) speculum variable, bordered in front and behind with black bars, and often narrowly behind with white, (c) chin and throat, pale buffy without streaks, (d) bill of male, bright yellow or yellow orange, nail and line along base of ridge and spot at base of bill, black; bill of female, dull orange, with blackish spots, and black spot at base, (e) broad paler edges to feathers of back, (f) feet, brilliant orange to orange red, duller and more orange in female.

Chief distinguishing features of MOTTLED DUCK: BOTH SEXES. Similar to the Florida Duck except the chin, cheek and throat are more heavily streaked, and entire plumage is darker in tone.

Downy Young, Plate No. 33.

Text: New Mexican Duck, page 157; Florida Duck, page 170; Mottled Duck, page 173.



A

MALLARD
(female)



C

NEW MEXICAN
DUCK



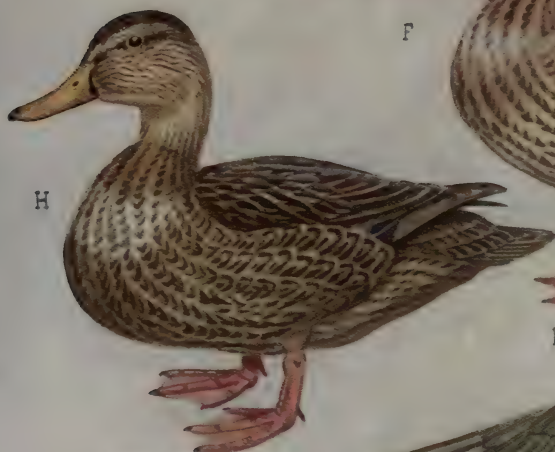
E



B



D



H

MOTTLED DUCK



F

FLORIDA DUCK



G



J

W. S. P. 1881

WINTER PLUMAGES

- (A) BALDPATE, adult male.
- (B) BALDPATE, adult male wing.
- (C) BALDPATE, adult female.
- (D) BALDPATE, adult female wing.

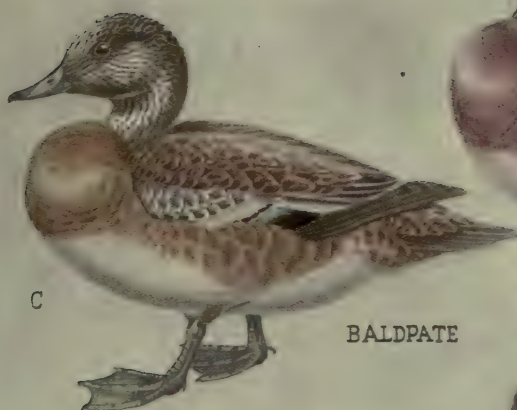
Chief distinguishing features of BALDPATE: MALE. (a) Hind toe without lobe, (b) head, with white crown and green patch on face and hind head, (c) underwing lining, pale grey, not mottled, axillars white or only sparsely flecked with grey, (d) bill, much shorter than head, greyish blue, with tip, extreme base and lower mandible, black. FEMALE. (a) Hind toe without lobe, (b) dull black speculum, with or without green, bordered inwardly with white, (c) blue-grey feet, (d) underwing surface, pale ashy, not mottled; axillars white.

- (E) EUROPEAN WIDGEON, adult male.
- (F) EUROPEAN WIDGEON, adult male wing.
- (G) EUROPEAN WIDGEON, adult female.
- (H) EUROPEAN WIDGEON, adult female wing.

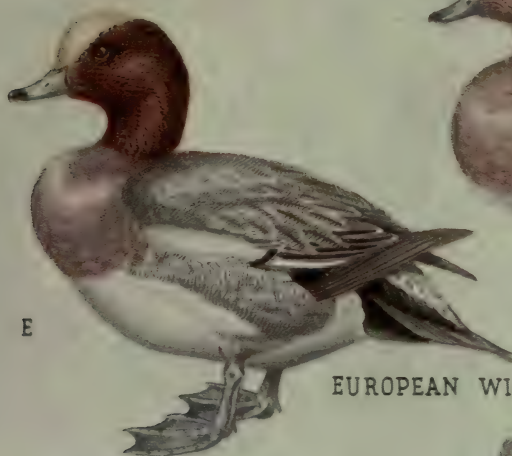
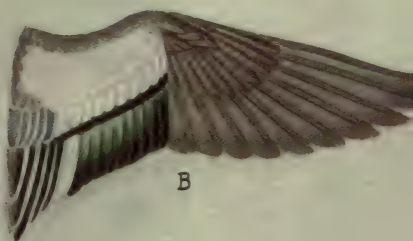
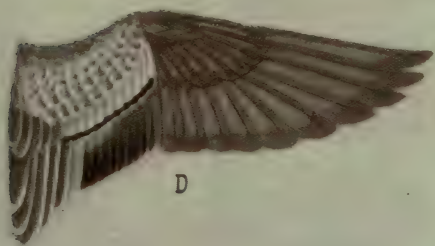
Chief distinguishing features of EUROPEAN WIDGEON: MALE. (a) Hind toe without lobe, (b) creamy crown, on red head, (c) underwing surface, ashy, mottled with grey. FEMALE. (a) Hind toe without lobe, (b) dull, dark speculum, usually with green gloss, bordered inwardly with white, (c) blue-grey feet, (d) underwing surface, mottled with grey; axillars speckled.

Autumn Plumage, Baldpate, Plate No. 11.
Downy Young, Plate No. 33.

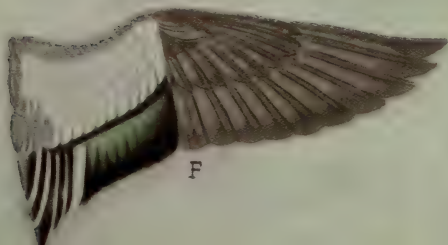
Text: Baldpate, page 183; European Widgeon, page 180.



BALDPATE



EUROPEAN WIDGEON



*Key to Plate No. 10**Plate No. 10 →*

WINTER PLUMAGES

- (A) AMERICAN PINTAIL, adult male.
- (B) AMERICAN PINTAIL, adult male wing.
- (C) AMERICAN PINTAIL, adult female.
- (D) AMERICAN PINTAIL, adult female wing.

Chief distinguishing features of AMERICAN PINTAIL: MALE. (a) Hind toe without lobe, (b) middle pair of tail-feathers greatly elongated, (c) dark brown head, and very long neck. FEMALE. (a) Hind toe without lobe, (b) long, thin neck, (c) tail pointed but not elongated, (d) bluish-grey feet.

- (E) GADWALL, adult male.
- (F) GADWALL, adult male wing.
- (G) GADWALL, adult female.
- (H) GADWALL, adult female wing.

Chief distinguishing features of GADWALL: MALE. (a) Hind toe without lobe, (b) white speculum, (c) yellow feet, (d) chestnut wing-patch. FEMALE. (a) Hind toe without lobe, (b) white speculum, (c) dull yellow feet.

Autumn Plumages, Plate No. 11.

Downy Young, Plate No. 33.

Hybrids, Plate No. 36.

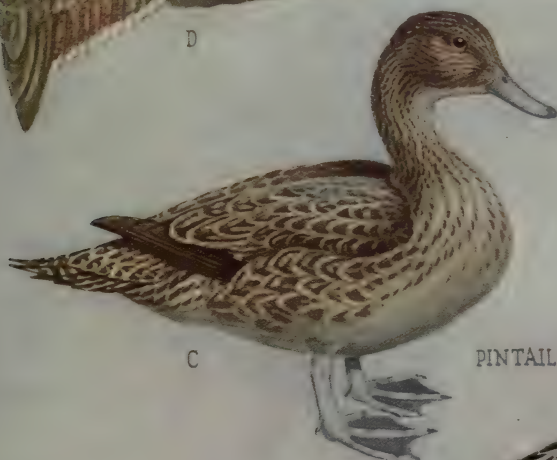
Text: American Pintail, page 189; Gadwall, page 175.



D



B



C

PINTAIL

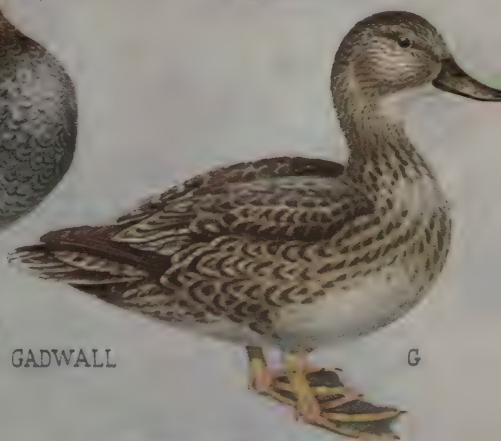


A



E

GADWALL

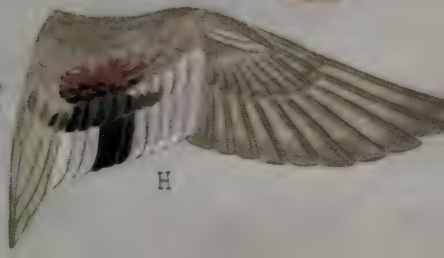


G



F

THE SHOOT



H

AUTUMN PLUMAGES

- (A) AMERICAN PINTAIL, adult male in early stage of autumn moult.
- (B) AMERICAN PINTAIL, adult male in later stage of autumn moult.
- (C) GADWALL, adult male in early stage of autumn moult.
- (D) GADWALL, adult male in later stage of autumn moult.
- (E) BALDPATE, adult male in early stage of autumn moult.
- (F) BALDPATE, adult male in later stage of autumn moult.

Note: Wings during this moult are as in full winter plumage.

EXPLANATION OF THE AUTUMN MOULT

During autumn, the males of the ducks are moulting out of the "eclipse" plumage, which closely resembles that of the female, into the full winter plumage of the drake. A careful examination of the plumage characters will disclose some indications of the male winter dress—slight in the early autumn but progressively increasing as the season advances. The full range of the moult will be best appreciated if the plates showing the female plumage and that of the male in winter are examined at the same time as this plate.

Young males of the year follow much the same sequence of moult out of the juvenile plumage (which also resembles that of the female) and are similar to adult males during the autumn moult, except for the wings, which differ as stated in "Description" of Juvenile in the text.

Consult "Specimen Identification" in the text, and section on "Identification of a Specimen in Hand."

Winter plumages:

American Pintail, Plate No. 10.
Gadwall, Plate No. 10.
Baldpate, Plate No. 9.

Text: American Pintail, page 189; Gadwall, page 175; Baldpate, page 183.



A

PINTAIL

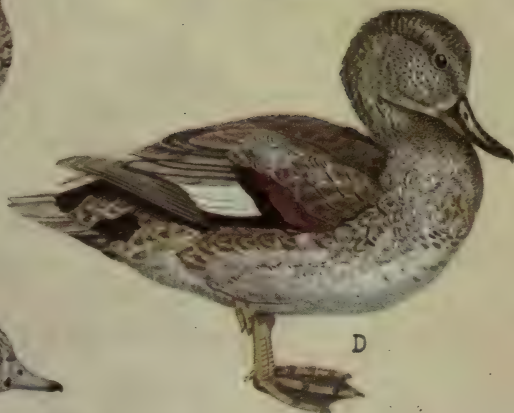


B



C

GADWALL



D



E

BALDPATE



F

*Key to Plate No. 12**Plate No. 12 →*

WINTER PLUMAGES

- (A) GREEN-WINGED TEAL, adult male.
- (B) GREEN-WINGED TEAL, adult male wing.
- (C) GREEN-WINGED TEAL, adult female.
- (D) GREEN-WINGED TEAL, adult female wing.

Chief distinguishing features of GREEN-WINGED TEAL: MALE. (a) Hind toe without lobe, (b) extremely small size, (c) vertical white bar on each side of body in front of wing. FEMALE. (a) Hind toe without lobe, (b) extremely small size, (c) speculum, black outwardly and green inwardly; bordered in front with brown and behind with white.

- (E) EUROPEAN TEAL, adult male.
- (F) EUROPEAN TEAL, adult male wing.
- (G) EUROPEAN TEAL, adult female.
- (H) EUROPEAN TEAL, adult female wing.

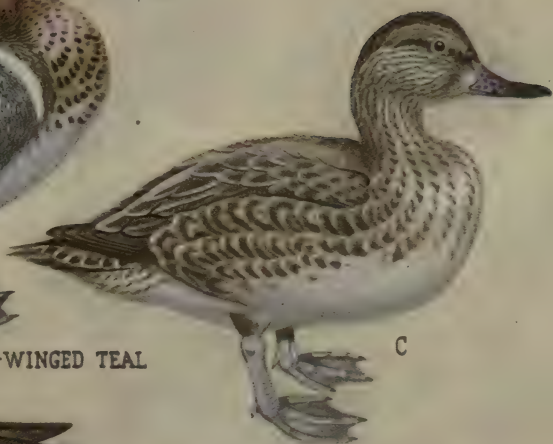
Chief distinguishing features of EUROPEAN TEAL: MALE. (a) Hind toe without lobe, (b) extremely small size, (c) horizontal white bar along line of shoulder above folded wing. FEMALE. Same as for female Green-winged Teal. For minor differences see "Specimen Identification" of Green-winged Teal in text.

Autumn Plumage, Green-winged Teal, Plate No. 14.
Downy Young, Plate No. 33.

Text: Green-winged Teal, page 198; European Teal, page 195.



A

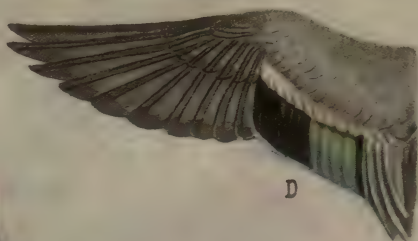


C

GREEN-WINGED TEAL



B



D

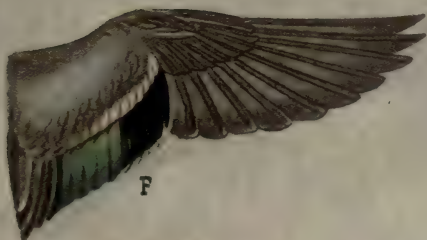


E

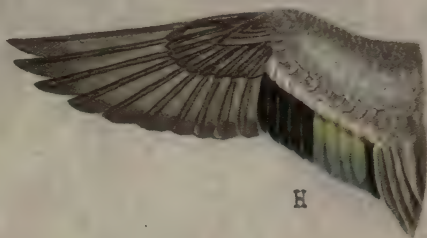


G

EUROPEAN TEAL



F



H

WINTER PLUMAGES

- (A) BLUE-WINGED TEAL, adult male.
- (B) BLUE-WINGED TEAL, adult male wing.
- (C) BLUE-WINGED TEAL, adult female.
- (D) BLUE-WINGED TEAL, adult female wing

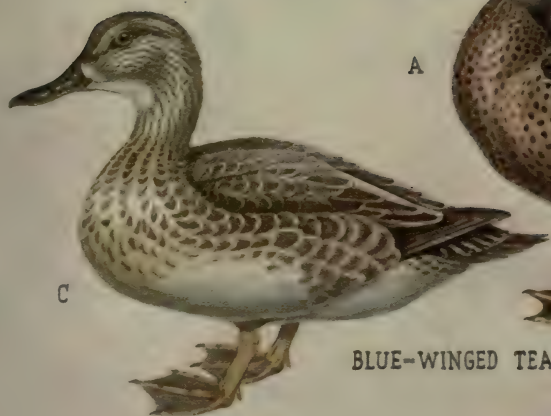
Chief distinguishing features of BLUE-WINGED TEAL: MALE. (a) Hind toe without lobe, (b) slate-grey head, with white, crescent-shaped patch in front of eye, (c) large cobalt-blue patch on forewing. FEMALE. (a) Hind toe without lobe, (b) very small size, (c) large blue patch on forewing.

- (E) CINNAMON TEAL, adult male.
- (F) CINNAMON TEAL, adult male wing.
- (G) CINNAMON TEAL, adult female.
- (H) CINNAMON TEAL, adult female wing.

Chief distinguishing features of CINNAMON TEAL: MALE. (a) Hind toe without lobe, (b) dark cinnamon-red plumage, (c) cobalt-blue wing coverts. FEMALE. Same as for female Blue-winged Teal. For minor differences see "Specimen Identification" in text.

Autumn Plumages, Plate No. 14.
Downy Young, Plate No. 33.

Text: Blue-winged Teal, page 204; Cinnamon Teal, page 210.

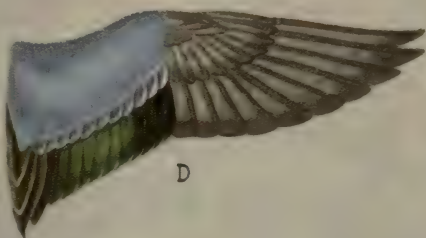


C

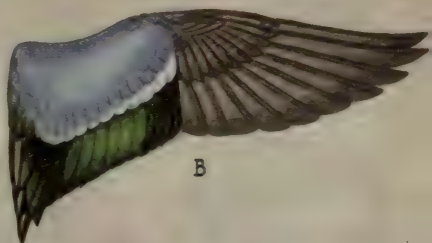
BLUE-WINGED TEAL



A



D



B



G

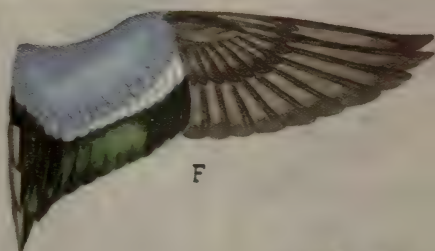
CINNAMON TEAL



E



H



F

AUTUMN PLUMAGES

- (A) GREEN-WINGED TEAL, adult male in early stage of autumn moult.
- (B) GREEN-WINGED TEAL, adult male in later stage of autumn moult.
- (C) BLUE-WINGED TEAL, adult male in early stage of autumn moult.
- (D) BLUE-WINGED TEAL, adult male in later stage of autumn moult.
- (E) WOOD DUCK, adult male during autumn moult.
- (F) CINNAMON TEAL, adult male in early stage of autumn moult.

Note: Wings during the autumn moult are as in full winter plumage.

EXPLANATION OF THE AUTUMN MOULT

During autumn, the males of the ducks are moulting out of the "eclipse" plumage, which closely resembles that of the female, into the full winter plumage of the drake. A careful examination of the plumage characters will disclose some indications of the male winter dress—slight in the early autumn but progressively increasing as the season advances. The full range of the moult will be best appreciated if the plates showing the female plumage and that of the male in winter are examined at the same time as this plate.

Young males of the year follow much the same sequence of moult out of the juvenile plumage (which also resembles that of the female) and are similar to adult males during the autumn moult, except for the wings, which differ as stated in "Description" of Juvenile in the text.

Consult "Specimen Identification" in the text, and section on "Identification of a Specimen in Hand."

Winter plumages:

Green-winged Teal, Plate No. 12

Blue-winged Teal, Plate No. 13.

Wood Duck, Plate No. 15.

Cinnamon Teal, Plate No. 13.

Text: Green-winged Teal, page 198; Blue-winged Teal, page 204; Wood Duck, page 221; Cinnamon Teal, page 210.

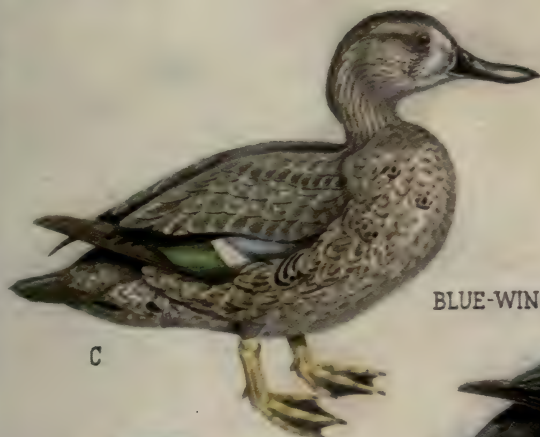


A

GREEN-WINGED TEAL



B



C

BLUE-WINGED TEAL



D



E

WOOD DUCK



F

CINNAMON TEAL

T.M. Shortt

*Key to Plate No. 15**Plate No. 15 →*

WINTER PLUMAGES

- (A) SHOVELLER, adult male.
- (B) SHOVELLER, adult male wing.
- (C) SHOVELLER, adult female.
- (D) SHOVELLER, adult female wing.

Chief distinguishing features of SHOVELLER: MALE. (a) Hind toe without lobe, (b) very long, broad, spoon-shaped bill, much longer than head. FEMALE. (a) Hind toe without lobe, (b) bill, same as in male above.

- (E) WOOD DUCK, adult male.
- (F) WOOD DUCK, adult male wing.
- (G) WOOD DUCK, adult female.
- (H) WOOD DUCK, adult female wing.

Chief distinguishing features of WOOD DUCK: MALE. (a) Hind toe without lobe, (b) unique combination of iridescent colours of crested head, body and wings, (c) dull yellow feet. FEMALE. (a) Hind toe without lobe, (b) elongated crest, (c) dull yellow feet, (d) bright-hued wing.

Autumn Plumage, Shoveller, Plate No. 17.

Autumn Plumage, Wood Duck, Plate No. 14.

Downy Young, Plate No. 33.

Text: Shoveller, page 215; Wood Duck, page 221.

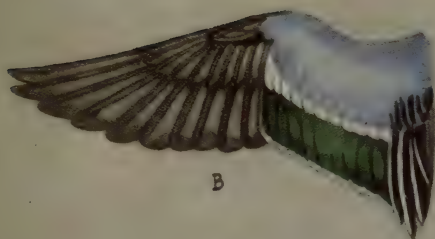


A

SHOVELLER



C



B



D



E

WOOD DUCK



G



F



H

*Key to Plate No. 16**Plate No. 16 →*

WINTER PLUMAGES

- (A) REDHEAD, adult male.
- (B) REDHEAD, adult male wing.
- (C) REDHEAD, adult female.
- (D) REDHEAD, adult female wing.

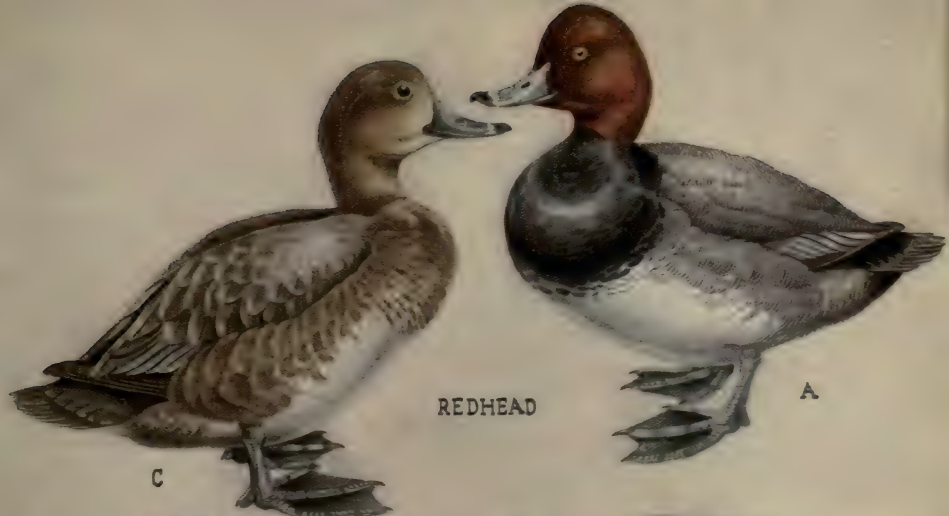
Chief distinguishing features of REDHEAD: MALE. (a) Hind toe with lobe, (b) high-domed head, with abrupt forehead, (c) bright reddish-chestnut head and upper neck, (d) bill short, about half as wide as long. FEMALE. (a) Hind toe with lobe, (b) yellowish-brown head, with whitish chin, (c) abrupt forehead, (d) short broad bill, (e) pearl-grey speculum.

- (E) CANVAS-BACK, adult male.
- (F) CANVAS-BACK, adult male wing.
- (G) CANVAS-BACK, adult female.
- (H) CANVAS-BACK, adult female wing.

Chief distinguishing features of CANVAS-BACK: MALE. (a) Hind toe with lobe, (b) sloping forehead and elongated head, (c) head and full length of neck, red, (d) bill as long as head. FEMALE. (a) Hind toe with lobe, (b) sloping forehead and elongated head, (c) bill as long as head.

Autumn Plumages, Plate No. 17.
Downy Young, Plate No. 34.

Text: Redhead, page 230; Canvas-back, page 241.



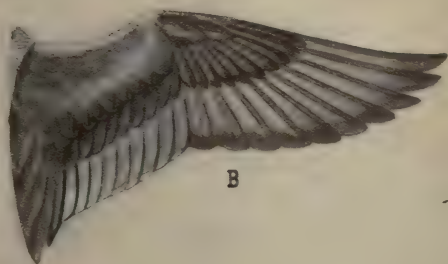
REDHEAD

A

C



D



B



E

CANVAS-BACK



G



F



H

AUTUMN PLUMAGES

(A) SHOVELLER, adult male in early stage of autumn moult.

(B) SHOVELLER, adult male in later stage of autumn moult.

Note: Wings during autumn moult are as in full winter plumage.

(C) CANVAS-BACK, adult male during autumn moult.

(D) REDHEAD, adult male during autumn moult.

(E) LESSER SCAUP DUCK, adult male in early stage of autumn moult.

(F) LESSER SCAUP DUCK, adult male in later stage of autumn moult.

GREATER SCAUP DUCK in autumn plumage is similar to LESSER SCAUP.

Note: Wings during autumn moult are as in full winter plumage.

EXPLANATION OF THE AUTUMN MOULT

During autumn, the males of the ducks are moulting out of the "eclipse" plumage, which closely resembles that of the female, into the full winter plumage of the drake. A careful examination of the plumage characters will disclose some indications of the male winter dress—slight in the early autumn but progressively increasing as the season advances. The full range of the moult will be best appreciated if the plates showing the female plumage and that of the male in winter are examined at the same time as this plate.

Young males of the year follow much the same sequence of moult out of the juvenile plumage (which also resembles that of the female) and are similar to adult males during the autumn moult, except for the wings, which differ as stated in "Description" of Juvenile in the text.

Consult "Specimen Identification" in the text, and section on "Identification of a Specimen in Hand."

Winter plumages:

Shoveller, Plate No. 15.

Canvas-back and Redhead, Plate No. 16.

Scaups, Plate No. 19.

Text: Shoveller, page 215; Canvas-back, page 241; Redhead, page 230; Lesser Scaup, page 252; Greater Scaup, page 248.



A

SHOVELLER



B



C

CANVAS - BACK



D

REDHEAD



E

SCAUP



F

W. S. H. 1871

WINTER PLUMAGES

- (A) RING-NECKED DUCK, adult male.
- (B) RING-NECKED DUCK, adult male wing.
- (C) RING-NECKED DUCK, adult female.
- (D) RING-NECKED DUCK, adult female wing.

Chief distinguishing features of RING-NECKED DUCK: MALE. (a) Hind toe with lobe, (b) two bluish-white rings on bill, one at base and one at tip, (c) grey speculum, (d) vague chestnut collar on lower neck. FEMALE. (a), (b), (c) same as in male, (d) whitish ring around eye, and whitish area at base of bill.

- (E) BUFFLE-HEAD, adult male.
- (F) BUFFLE-HEAD, adult male wing.
- (G) BUFFLE-HEAD, adult female.
- (H) BUFFLE-HEAD, adult female wing.

Chief distinguishing features of BUFFLE-HEAD: MALE. (a) Hind toe with lobe, (b) very small size, (c) puffy, dark head, with triangular white head-patch, (d) wing mainly white. FEMALE. (a) and (b) same as male, (c) white speculum, (d) white face-patch behind eye.

Autumn Plumages, Plate No. 21.
Downy Young, Plate No. 34.

Text: Ring-necked Duck, page 236; Buffle-head, page 273.



C

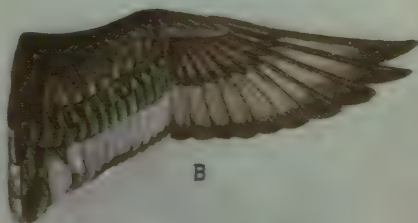
RING-NECKED DUCK



A



D



B



E

BUFFLE-HEAD



G



F



H

T. M. Shortliff

*Key to Plate No. 19**Plate No. 19 →*

WINTER PLUMAGES

- (A) GREATER SCAUP DUCK, adult male.
- (B) GREATER SCAUP DUCK, adult male wing.
- (C) GREATER SCAUP DUCK, adult female.
- (D) GREATER SCAUP DUCK, adult female wing.

Chief distinguishing features of GREATER SCAUP DUCK: Same as for Lesser Scaup (below) except (a) head of male glossed with greenish, (b) white area on wings of both sexes extends far into primary feathers, (c) bill, see text.

- (E) LESSER SCAUP DUCK, adult male.
- (F) LESSER SCAUP DUCK, adult male wing.
- (G) LESSER SCAUP DUCK, adult female.
- (H) LESSER SCAUP DUCK, adult female wing

Chief distinguishing features of LESSER SCAUP DUCK: MALE. (a) Hind toe with lobe, (b) solidly black head glossed with purplish; black neck, chest and foreback, (c) white speculum, but no white on primaries, though three inner ones may be palish. FEMALE. (a) Hind toe with lobe, (b) white area across face at base of bill, (c) white speculum, but no white on primaries, though three inner ones may be palish.

Autumn Plumages, Plate No. 17.
Downy Young, Plate No. 34.

Text: Greater Scaup Duck, page 248; Lesser Scaup Duck, page 252.



C



A

GREATER SCAUP



D



B



G

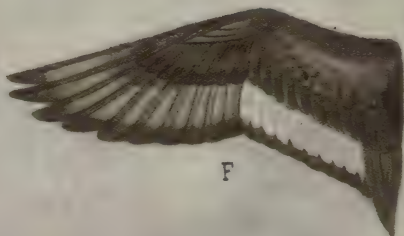


E

LESSER SCAUP



H



F

WINTER PLUMAGES

- (A) AMERICAN GOLDEN-EYE, adult male.
- (B) AMERICAN GOLDEN-EYE, adult male wing.
- (C) AMERICAN GOLDEN-EYE, adult female.
- (C.1) AMERICAN GOLDEN-EYE, adult female bill during breeding season.
- (D) AMERICAN GOLDEN-EYE, adult female wing.

Chief distinguishing features of AMERICAN GOLDEN-EYE: MALE. (a) Hind toe with lobe, (b) black head, with round white spot between eye and base of bill. FEMALE. (a) Hind toe with lobe, (b) snuff-brown head, (c) short neck, with white collar incomplete behind.

- (E) BARROW'S GOLDEN-EYE, adult male.
- (F) BARROW'S GOLDEN-EYE, adult male wing.
- (G) BARROW'S GOLDEN-EYE, adult female.
- (G.1) BARROW'S GOLDEN-EYE, adult female bill during breeding season.
- (H) BARROW'S GOLDEN-EYE, adult female wing.

Chief distinguishing features of BARROW'S GOLDEN-EYE: MALE. (a) Hind toe with lobe, (b) purplish-black head, with crescent-shaped white spot between eye and base of bill (see also "Specimen Identification" of male American Golden-eye). FEMALE. Similar to female American Golden-eye. See "Specimen Identification" of female American Golden-eye.

Autumn Plumage, Plate No. 21.
Downy Young, Plate No. 34.

Text: American Golden-eye, page 259; Barrow's Golden-eye, page 269.



A



C



C.1

AMERICAN GOLDEN-EYE



B



D



E

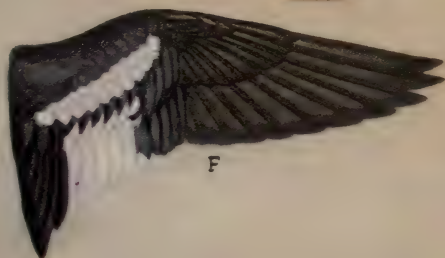


G



G.1

BARROW'S GOLDEN-EYE



F



H

AUTUMN PLUMAGES

- (A) RING-NECKED DUCK, adult male in early stage of autumn moult.
- (B) RING-NECKED DUCK, adult male in later stage of autumn moult.
- (C) AMERICAN GOLDEN-EYE, adult male during autumn moult.
- (D) BARROW'S GOLDEN-EYE, adult male during autumn moult.
- (E) BUFFLE-HEAD, adult male during autumn moult.
- (F) HARLEQUIN DUCK, adult male during autumn moult.

Note: During autumn moult the wing is as in winter plumage.

EXPLANATION OF THE AUTUMN MOULT

During autumn, the males of the ducks are moulting out of the "eclipse" plumage, which closely resembles that of the female, into the full winter plumage of the drake. A careful examination of the plumage characters will disclose some indications of the male winter dress—slight in the early autumn but progressively increasing as the season advances. The full range of the moult will be best appreciated if the plates showing the female plumage and that of the male in winter are examined at the same time as this plate.

Young males of the year follow much the same sequence of moult out of the juvenile plumage (which also resembles that of the female) and are similar to adult males during the autumn moult, except for the wings, which differ as stated in "Description" of Juvenile in the text.

Consult "Specimen Identification" in the text, and section on "Identification of a Specimen in Hand."

Winter plumages:

Ring-necked Duck and Buffle-head, Plate No. 18.
American and Barrow's Golden-eye, Plate No. 20.
Harlequin Duck, Plate No. 23.

Text: Ring-necked Duck, page 236; American Golden-eye, page 259; Barrow's Golden-eye, page 269; Buffle-head, page 273; Eastern Harlequin Duck, page 287; Western Harlequin Duck, page 292.



A

RING-NECKED DUCK



B



C

AMERICAN GOLDEN-EYE



D

BARROW'S GOLDEN-EYE



E

BUFFLE-HEAD



F

HARLEQUIN DUCK

T.M. Shortt -

Key to Plate No. 22

Plate No. 22 →

WINTER AND SUMMER PLUMAGES

- (A) OLD-SQUAW, adult male in winter plumage.
- (B) OLD-SQUAW, wing of adult male in winter plumage.
- (C) OLD-SQUAW, adult female in winter plumage.
- (D) OLD-SQUAW, wing of adult female in winter plumage.
- (E) OLD-SQUAW, adult male in summer plumage.
- (F) OLD-SQUAW, wing of adult male in summer plumage.
- (G) OLD-SQUAW, adult female in summer plumage.
- (H) OLD-SQUAW, wing of adult female in summer plumage.

Chief distinguishing features of OLD-SQUAW: MALE. (a) Hind toe with lobe, (b) greatly elongated middle tail-feathers, (c) piebald markings, in winter mainly white, in summer mainly brown, (d) bill short and stubby. FEMALE. (a) Hind toe with lobe, (b) head and very short neck, piebald, brown and white, (c) bill very short, about one inch, and stubby, (d) whole body, in both plumages, piebald.

Downy Young, Plate No. 34.

Text: page 279.



C

OLD - SQUAW
(Winter)



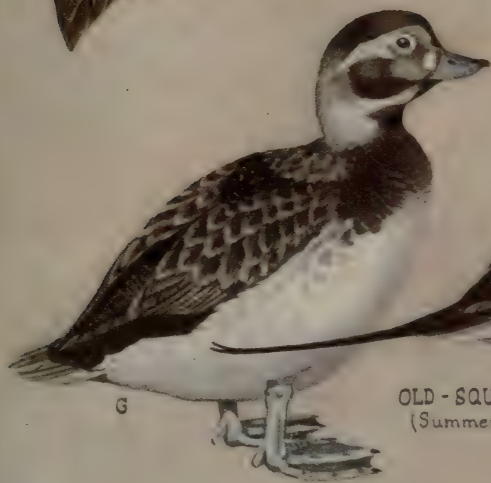
A



D



B



G

OLD - SQUAW
(Summer)

H



H

H



F

J.M. Shortt.
1940

WINTER PLUMAGES

- (A) STELLER'S EIDER, adult male.
- (B) STELLER'S EIDER, adult male wing.
- (C) STELLER'S EIDER, adult female.
- (D) STELLER'S EIDER, adult female wing.

Chief distinguishing features of STELLER'S EIDER: MALE. (a) Hind toe with lobe, (b) white head, with black throat and neck; black ring around eye, (c) some scapulars, secondaries, and tertials greatly elongated, (d) white wing-coverts. FEMALE, (a) Hind toe with lobe, (b) speculum bordered in front and behind with white bars.

- (E) EASTERN HARLEQUIN DUCK, adult male.
- (F) EASTERN HARLEQUIN DUCK, adult male wing.
- (G) EASTERN HARLEQUIN DUCK, adult female.
- (H) EASTERN HARLEQUIN DUCK, adult female wing.
- (J) WESTERN HARLEQUIN DUCK, adult male head.

Chief distinguishing features of EASTERN HARLEQUIN DUCK: MALE. (a) Hind toe with lobe, (b) sides, rich reddish-brown, (c) slaty-blue plumage, marked with many white spots and stripes, (d) small size. FEMALE. (a) Hind toe with lobe, (b) two small and one large white spot on side of head, (c) entire upper surface, including wings, solid olive brown, with no white feathers, (d) breast, mottled greyish brown.

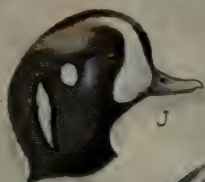
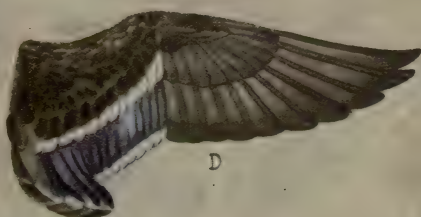
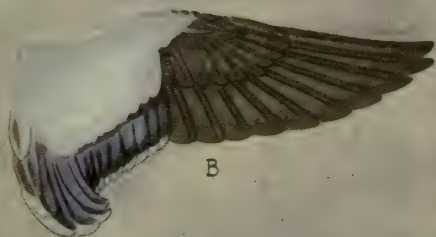
Chief distinguishing features of WESTERN HARLEQUIN DUCK: MALE. Same as for Eastern Harlequin except that the chestnut stripes on each side of the crown do not extend so far forward, and their colour is not so rich. FEMALE. Identical with female Eastern Harlequin Duck.

Eastern Harlequin in autumn plumage, Plate No. 21.
Downy Young, Steller's Eider, Plate No. 34.
Downy Young, Harlequin Duck, Plate No. 35.

Text: Steller's Eider, page 296; Eastern Harlequin Duck, page 287;
 Western Harlequin Duck, page 292.



STELLER'S EIDER



HARLEQUIN DUCK



Key to Plate No. 24

Plate No. 24 →

WINTER PLUMAGES

- (A) AMERICAN EIDER, adult male.
- (B) AMERICAN EIDER, adult female.
- (C) PACIFIC EIDER, adult male.
- (D) PACIFIC EIDER, adult female.
- (E) NORTHERN EIDER, adult male head.
- (F) Wing of male AMERICAN, NORTHERN and PACIFIC EIDERS.
- (G) Wing of female AMERICAN, NORTHERN and PACIFIC EIDERS.

Chief distinguishing features of the MALES of these Eiders lie in the conformation of the bill-processes and in the presence or lack of the black V on the throat. See "Specimen Identification" and "Description" of American Eider in the text. FEMALES. To separate the females of these Eiders see "Specimen Identification" of female American Eider.

Autumn Plumage, Plate No. 29.
Downy Young, Plate No. 34.

Text: American Eider, page 302; Pacific Eider, page 312; Northern Eider, page 300.



AMERICAN EIDER



PACIFIC EIDER

Key to Plate No. 25

Plate No. 25 →

WINTER PLUMAGES

(A) KING EIDER, adult male.

(B) KING EIDER, adult male wing.

(C) KING EIDER, adult female.

(D) KING EIDER, adult female wing.

Chief distinguishing features of KING EIDER: MALE. (a) Hind toe with lobe, (b) bill-processes, see "Specimen Identification" in text. FEMALE. (a) Hind toe with lobe, (b) bill-processes, see "Description." To separate from other female Eiders see "Specimen Identification" of female American Eider.

(E) SPECTACLED EIDER, adult male.

(F) SPECTACLED EIDER, adult male wing.

(G) SPECTACLED EIDER, adult female.

(H) SPECTACLED EIDER, adult female wing.

Chief distinguishing features of SPECTACLED EIDER: MALE. (a) Hind toe with lobe, (b) white "spectacle" outlined in black around eye, (c) feathering on upper mandible extends past nostril. FEMALE. (a) Hind toe with lobe, (b) large, pale area around eye, (c) feathering on upper mandible extends past nostril.

Autumn Plumage, Plate No. 29.
Downy Young, Plate No. 34.

Text: King Eider, page 315; Spectacled Eider, page 321.



C

KING EIDER



A



D



B



G

SPECTACLED EIDER



E



H



F

*Key to Plate No. 26**Plate No. 26 →*

WINTER AND AUTUMN PLUMAGES

- (A) AMERICAN SCOTER, adult male.
- (B) AMERICAN SCOTER, adult male wing.
- (C) AMERICAN SCOTER, adult female.
- (D) AMERICAN SCOTER, adult female wing.

Chief distinguishing features of AMERICAN SCOTER: MALE. (a) Hind toe with lobe, (b) yellow protuberance at base of bill above, (c) feathering of forehead ends square across base of bill, (d) high forehead and rounded head. FEMALE. (a) Hind toe with lobe, (b) very dark crown, clearly defined against cheeks, chin and throat, (c) and (d) as in male.

- (E) WHITE-WINGED SCOTER, adult male.
- (F) WHITE-WINGED SCOTER, adult male wing.
- (G) WHITE-WINGED SCOTER, adult female.
- (H) WHITE-WINGED SCOTER, adult female wing.

Chief distinguishing features of WHITE-WINGED SCOTER: MALE. (a) Hind toe with lobe, (b) white speculum, and small white patch near eye, (c) feathering on ridge of bill extends nearly to nostril, and feathering on sides of bill nearly as far as that on ridge, (d) head elongated, slope of forehead follows line of bill. FEMALE. (a) Hind toe with lobe, (b) white speculum, (c) and (d) same as male.

Downy Young, Plate No. 35.

Text: American Scoter, page 338; White-winged Scoter, page 325.



AMERICAN SCOTER



WHITE-WINGED
SCOTER



T. M. Shortt

*Key to Plate No. 27**Plate No. 27 →*

WINTER AND AUTUMN PLUMAGES

- (A) SURF SCOTER, adult male.
- (B) SURF SCOTER, adult male wing.
- (C) SURF SCOTER, adult female.
- (D) SURF SCOTER, adult female wing.

Chief distinguishing features of SURF SCOTER: MALE. (a) Hind toe with lobe, (b) white patch on forehead, and another on nape, (c) head elongated, forehead following slope of bill, (d) a peculiar varicoloured bill, see "Description." FEMALE. (a) Hind toe with lobe, (b) black crown, two poorly defined white cheek-patches, whitish patch on back of head, (c) as in male.

- (E) WHITE-WINGED SCOTER, juvenile. Sexes alike.
- (F) SURF SCOTER, juvenile. Sexes alike.
- (G) AMERICAN SCOTER, juvenile. Sexes alike.

(Note: The juvenile White-winged Scoter is readily recognized by its white speculum. These three juveniles can be separated by the shape of the head and by the featheration at base of bill. Compare the heads with those of the respective adults. See "Descriptions.")

Downy Young, Plate No. 35.

Text: Surf Scoter, page 333; White-winged Scoter, page 325; American Scoter, page 338.

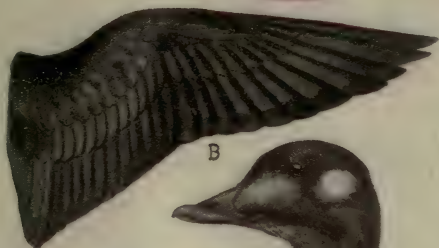


A

SURF SCOTER



C



B



D



E

WHITE-WINGED SCOTER
(Juvenile)



F



G

SURF SCOTER
(Juvenile)

WINTER PLUMAGES

- (A) AMERICAN MERGANSER, adult male.
- (B) AMERICAN MERGANSER, adult male wing.
- (C) AMERICAN MERGANSER, adult female.
- (D) AMERICAN MERGANSER, adult female wing.

Chief distinguishing features of AMERICAN MERGANSER: MALE. (a) Hind toe with lobe, (b) typical merganser bill, long, narrow, cylindrical and toothed, (c) nostril near middle of bill, (d) feathering on upper mandible extends forward about equal to feathering on lower mandible, (e) head without pronounced crest. FEMALE. (a), (b), (c) and (d) same as male, (e) head with elongated crest, (f) large white throat-patch, distinctly outlined against red of cheek and neck, (g) red of upper neck clearly defined against colour of lower neck.

- (E) RED-BREASTED MERGANSER, adult male.
- (F) RED-BREASTED MERGANSER, adult male wing.
- (G) RED-BREASTED MERGANSER, adult female.
- (H) RED-BREASTED MERGANSER, adult female wing.

Chief distinguishing features of RED-BREASTED MERGANSER: MALE. (a) Hind toe with lobe, (b) typical merganser bill, long, narrow, cylindrical and toothed, (c) nostril near base of bill, (d) feathering on upper mandible extends forward to a sharp angle and forward of feathering on lower mandible, (e) dark head with straggly, double-pointed crest, (f) white collar and reddish band across upper chest. FEMALE. (a), (b), (c) and (d) same as male, (e) brownish head, with straggly double-pointed crest, (f) brown of head merges imperceptibly into whitish foreneck.

Autumn Plumage, Plate No. 29.
Downy Young, Plate No. 35.

Text: American Merganser, page 348; Red-breasted Merganser, page 357.



A



C

AMERICAN MERGANSER



B



D



E



G

RED-BREASTED MERGANSER



F



H

AUTUMN PLUMAGES

- (A) RED-BREASTED MERGANSER, adult male during autumn moult.
- (B) AMERICAN MERGANSER, adult male during autumn moult.
- (C) HOODED MERGANSER, adult male during autumn moult.
- (D) KING EIDER, adult male during autumn moult.
- (E) AMERICAN EIDER, adult male during autumn moult.

Note: During autumn moult the wing is as in winter plumage.

EXPLANATION OF THE AUTUMN MOULT

During autumn, the males of the ducks are moulting out of the "eclipse" plumage, which closely resembles that of the female, into the full winter plumage of the drake. A careful examination of the plumage characters will disclose some indications of the male winter dress—slight in the early autumn but progressively increasing as the season advances. The full range of the moult will be best appreciated if the plates showing the female plumage and that of the male in winter are examined at the same time as this plate.

Young males of the year follow much the same sequence of moult out of the juvenile plumage (which also resembles that of the female) and are similar to adult males during the autumn moult, except for the wings, which differ as stated in "Description" of Juvenile in the text.

Consult "Specimen Identification" in the text, and section on "Identification of a Specimen in Hand."

Winter plumages:

Red-breasted Merganser, Plate No. 28.

American Merganser, Plate No. 28.

Hooded Merganser, Plate No. 30.

American Eider, Plate No. 24.

King Eider, Plate No. 25.

Text: Red-breasted Merganser, page 357; American Merganser, page 348; Hooded Merganser, page 343; American Eider, page 302; King Eider, page 315.



A

RED-BREASTED
MERGANSER



B

AMERICAN MERGANSER



C

HOODED MERGANSER



E

AMERICAN EIDER



D

KING EIDER

T.M. Shortt

*Key to Plate No. 30**Plate No. 30 →*

WINTER PLUMAGE

- (A) HOODED MERGANSER, adult male.
- (B) HOODED MERGANSER, adult male wing.
- (C) HOODED MERGANSER, adult female.
- (D) HOODED MERGANSER, adult female wing.

Chief distinguishing features of HOODED MERGANSER: MALE. (a) Hind toe with lobe, (b) typical merganser bill, narrow, cylindrical and toothed, but short and black. FEMALE. (a) Hind toe with lobe, (b) typical merganser bill but short and dark.

WINTER AND SUMMER PLUMAGES

- (E) RUDDY DUCK, adult male in summer.
- (F) RUDDY DUCK, adult male in winter.
- (G) RUDDY DUCK, adult female (winter and summer).
- (H) RUDDY DUCK, adult wing (both sexes).

Chief distinguishing features of RUDDY DUCK: MALE. (a) Hind toe with lobe, (b) spike-like tail, with practically no coverts, (c) in winter, solidly white cheeks and dark crown. FEMALE. (a) and (b) as in male, (c) dark crown and whitish or mottled cheeks.

Autumn Plumage, Hooded Merganser, Plate No. 29.
Downy Young, Plate No. 35.

Text: Hooded Merganser, page 343; Ruddy Duck, page 364.



HOODED MERGANSER



RUDDY DUCK



WINTER AND AUTUMN PLUMAGES

- (A) MASKED DUCK, adult male.
- (B) MASKED DUCK, adult male wing.
- (C) MASKED DUCK, adult female.
- (D) MASKED DUCK, adult female wing.

Chief distinguishing features of MASKED DUCK: MALE. (a) Hind toe with lobe, (b) black head, (c) spike-like tail-feathers, (d) white patch on wing. FEMALE. (a) Hind toe with lobe, (b) two black streaks on creamy cheeks, (c) spike-like tail-feathers, (d) white patch on wing.

- (E) FULVOUS TREE DUCK, adult. Sexes alike.
- (F) FULVOUS TREE DUCK, adult wing.

Chief distinguishing features of FULVOUS TREE DUCK: (a) Hind toe without lobe, (b) breast, buffy-brown, (c) feet, bluish-grey.

- (G) BLACK-BELLIED TREE DUCK, adult. Sexes alike.
- (H) BLACK-BELLIED TREE DUCK, adult wing.

Chief distinguishing features of BLACK-BELLIED TREE DUCK: (a) Hind toe without lobe, (b) breast black, (c) feet, pinkish-white.

Downy Young, Plate No. 35.

Text: Masked Duck, page 372; Fulvous Tree Duck, page 376; Black-bellied Tree Duck, page 374.

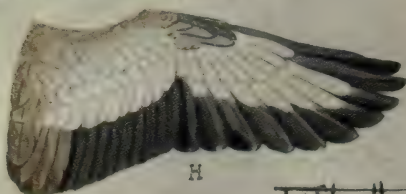


MASKED DUCK



FULVOUS TREE DUCK

BLACK-BELLIED TREE DUCK



Key to Plate No. 32

Plate No. 32 →

DOWNY YOUNG OF THE GEESE

- (A) ROSS'S GOOSE (after Blaauw)
- (B) SNOW GOOSE (Greater and Lesser Snow Geese, identical).
- (C) BLUE GOOSE.
- (D) WHITE-FRONTED GOOSE (Tule Goose, similar).
- (E) BLACK BRANT.
- (F) AMERICAN BRANT.
- (G) EMPEROR GOOSE.
- (H) COMMON CANADA GOOSE (Lesser Canada Goose and Richardson's Goose, similar).
- (J) WESTERN CANADA GOOSE (Cackling Goose, similar).



A



B



C



D



E



F



G



H



J

T. M. Sher.

Key to Plate No. 33

Plate No. 33 →

DOWNY YOUNG OF THE RIVER AND POND DUCKS

- (A) COMMON MALLARD.
- (B) BLACK DUCK.
- (D) CADWALL.
- (E) PINTAIL.
- (F) BALDPATE.
- (G) BLUE-WINGED TEAL.
- (H) CINNAMON TEAL.
- (J) GREEN-WINGED TEAL.
- (K) SHOVELLER.
- (L) WOOD DUCK.



A



B



C



D



E



F



G



H



J



K



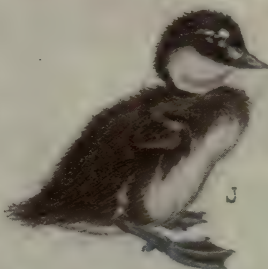
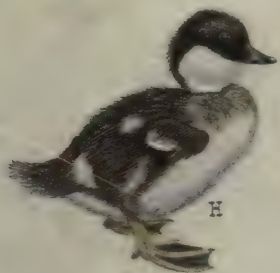
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Key to Plate No. 34

Plate No. 34 →

DOWNY YOUNG OF THE DIVING DUCKS

- (A) LESSER SCAUP DUCK.
- (B) GREATER SCAUP DUCK.
- (C) CANVAS-BACK.
- (D) REDHEAD.
- (E) RING-NECKED DUCK.
- (F) BUFFLE-HEAD.
- (G) AMERICAN GOLDEN-EYE.
- (H) BARROW'S GOLDEN-EYE.
- (J) OLD-SQUAW.
- (K) AMERICAN EIDER (Northern Eider similar)
- (L) KING EIDER.
- (M) PACIFIC EIDER.
- (N) STELLER'S EIDER.
- (O) SPECTACLED EIDER.



Key to Plate No. 35

Plate No. 35 →

DOWNY YOUNG OF THE DIVING DUCKS (continued)

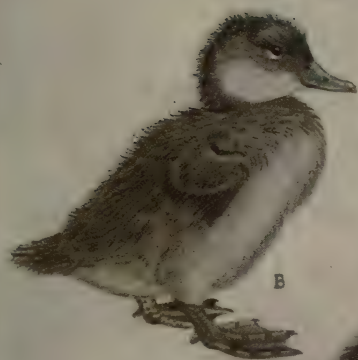
- (A) EASTERN HARLEQUIN DUCK (Western Harlequin Duck, similar).
- (B) AMERICAN SCOTER.
- (C) SURF SCOTER.
- (D) WHITE-WINGED SCOTER.

DOWNY YOUNG OF MERGANSERS AND OTHERS

- (E) RED-BREASTED MERGANSER.
- (F) AMERICAN MERGANSER.
- (G) HOODED MERGANSER.
- (H) BLACK-BELLIED TREE DUCK.
- (J) FULVOUS TREE DUCK.
- (K) RUDDY DUCK



A



B



C



D



E



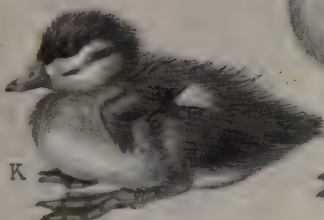
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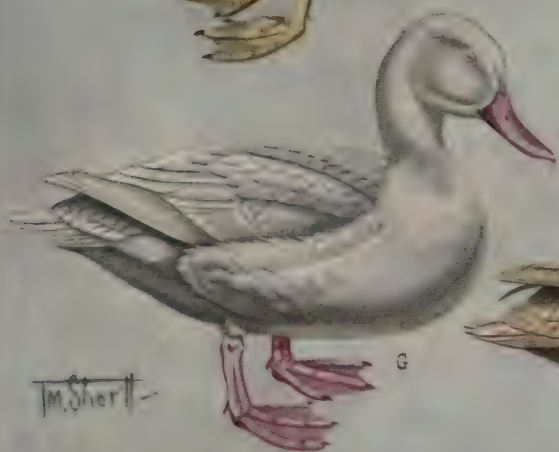
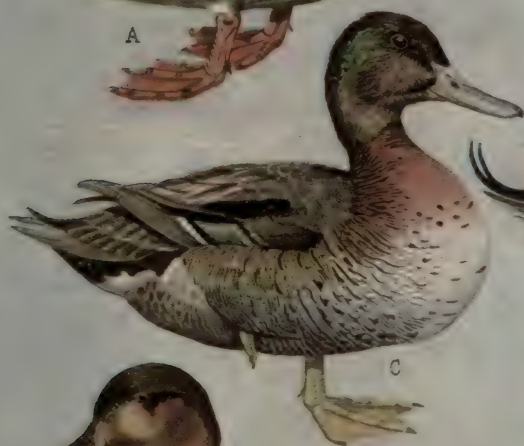
J

M. Shortt

*Key to Plate No. 36**Plate No. 36 →*

- (A) MALLARD-BLACK hybrid.
- (B) MALLARD-BLACK hybrid.
- (C) MALLARD-PINTAIL hybrid.
- (D) MALLARD-PINTAIL hybrid.
- (E) MALLARD-GADWALL hybrid (Brewer's Duck, after Audubon).
- (F) HOODED MERGANSER-AMERICAN GOLDEN-EYE hybrid.
- (G) Albino (Mallard).
- (H) Partial albino (Mallard).

(See Hybridism, page 43.)





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F. H. K.

Toronto, Canada;
 March, 1942.

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